Efficiency Unit
Cabinet Office

Multi-Departmental Scrutiny of Public Sector Research Establishments

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MULTI-DEPARTMENTAL SCRUTINY OF PUBLIC SECTOR RESEARCH ESTABLISHMENTS

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Unit Scrutiny

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This report was commissioned by the Chancellor of the Duchy of Lancaster, and was prepared by a multi-departmental team attached to the Efficiency Unit. The views expressed in the report are those of the team.

Comments on the report should be sent by 11 November 1994 to Ms Helen Williams, Head of Trans-Departmental Science and Technology Group, Office of Science and Technology, Room 3/8 Albany House, 84–86 Petty France, London SW1H 9ST. The contact number for telephone enquiries is 071-271 2036. In line with its policy of openness, the Government may wish to publish the comments received. Those replying should therefore specify if they wish their contribution to be treated as confidential.

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TERMS OF REFERENCE

On a sector by sector basis:

— to identify those public sector research establishments where early privatisation is feasible and desirable;

— where early privatisation is not feasible or desirable, to identify the potential for rationalisation of facilities or capabilities, and recommend means of implementing such rationalisation;

— to consider whether changes to current ownership and financing arrangements for establishments would lead to more effective operation of the open market and better value for money; if so, to recommend one or more alternative models.

SUMMARY

1. The present scrutiny was commissioned to consider the future status of civil public sector research establishments in Scotland, England and Wales, looking at privatisation, rationalisation and different options for ownership. Underlying considerations included the aim of achieving best value for money across the board from public expenditure on science and technology; the Government's desire, in this context, to extend and accelerate the operation of market forces; the need, given changing Government expenditure patterns on science and technology, to minimise the costs associated with public sector capabilities and ensure that funding is devoted not to overheads but to the delivery of good and effective science; and the Government's recognition that science and technology are integral to the missions of many Departments and that changes should strengthen the effective provision of scientific expertise and advice.

2. Some 50 establishments were included within the ambit of the scrutiny. They vary in size from 48 staff to 8000; in function, from basic research on molecular biology to testing of large engineering/building structures; and in form from integral parts of Government Departments to registered charities/ companies limited by guarantee, and from non-departmental bodies overseen by boards with their own statutory functions to laboratories partly or fully integrated with university departments. They report to a number of different Government Departments or Research Councils. Most are small (less than 400 staff); many have missions which to a greater or lesser extent overlap. As "businesses", they exhibit widely different cultures. In general, however, they are dependent on Government for the large majority of their funding. Establishments within the Research Council and Scottish Agricultural Research Institute systems undertake basic and applied research aimed at improving quality of life and enhancing wealth creation; establishments parented by Government Departments carry out applied research and other scientific and technical activities which underpin Departments' statutory, regulatory and policy roles.

3. In considering the scope for early privatisation, the team took into account, *inter alia,* the reviews undertaken as part of the "Next Steps" prior options process, and special reviews undertaken by individual Departments. There was full transparency between these reviews and our scrutiny. A

number of establishments (the National Engineering Laboratory, AEA Technology, the Laboratory of the Government Chemist, and the Transport Research Laboratory) were announced or confirmed as privatisation candidates in the course of our review, while the National Physical Laboratory is to be given Government-owned-contractor-operated status, which may lead to its privatisation in the longer term. We identified two additional establishments as meriting further detailed consideration for early privatisation: the Building Research Establishment and ADAS, Next Steps Agencies parented respectively by the Department of the Environment and the Ministry of Agriculture, Fisheries and Food. The total annual costs of these actual and potential privatisation candidates represent nearly 50% of the costs of all establishments in the scrutiny. We also saw a need for several procedural modifications to ensure a consistent approach is taken when establishments are reviewed for potential privatisation. Given the nature of the activities undertaken by public sector research establishments, mergers with or transfers to university departments represent a particularly fruitful area for consideration, and we believe that this possibility should be formally and regularly reviewed.

4. There has been substantial rationalisation of civil research establishments over the last ten years or so, but this has, understandably, tended to take place on a departmental or single Research Council basis. While actual duplication between establishments is rare, the scrutiny found significant areas of overlapping activity. Given the changes in public expenditure patterns on science and technology and the likelihood that an increasing proportion of Government requirements will be met from the private sector, it is clearly important to consider the potential for rationalisation across departmental and Research Council boundaries in order to ensure the delivery of good and effective science in a way which represents best value for money.

5. It is for customers/sponsors to determine what work should be undertaken. Policy and organisational changes in the last few years have strengthened the capability of customers in Departments to exercise freedom of choice in specifying and sourcing their requirements. There is a need, however, to ensure that the response to changes in the market is co-ordinated and coherent, and to avoid piecemeal solutions which could result in sub-optimal decisions being taken.

6. Of the possible co-ordination and efficiency mechanisms, the most powerful is structural change bringing together groups of establishments under a single Chief Executive who can, with customers/sponsors, take a long term view of the requirements to be met and the supply-side changes necessary to meet them in the most cost-effective way. Larger organisations may also have other benefits in terms of critical mass, better career structures for scientists and so on.

7. The scrutiny team reviewed a number of possible organisational models, ranging from a grouping of all the establishments under central OPSS ownership to smaller conglomerations oriented towards particular markets and parented by Departments/Research Councils with which there was major commonality of interest and purpose. We also looked at the possibility of rationalisation on a geographical basis. The options were considered from a number of points of view: the degree of overlap between establishments, and the potential this implied for savings and/or flexible use of resources; the advantages of separating 'owner' responsibilities from 'customer' functions; the need for the owner to be able to provide strategic direction to the organisation; and the issue of Ministerial accountability, particularly for regulatory or statutory activity. Our analysis indicated that two models in particular should be considered further:

— the creation of four market sector oriented organisational groupings dealing with marine resources and environment; environment (non-marine); biotechnology and biological science; and food and agriculture;

— the creation of geographically-based groupings in Scotland and in England and Wales.

8. We also considered alternative methods, short of structural change, for providing a co-ordinated response to changing market conditions. Our conclusion was that the most effective would be the appointment, by the Research Councils and Departments concerned, of two Directors of Rationalisation tasked with recommending rationalisation in and across the areas of most concentrated overlap. The Directors of Rationalisation would take an overview of requirements and capabilities in a similar way to the Chief Executives postulated for the structural groupings. They would not, however, have executive powers, and there would need to be a prior commitment by Departments/Research Councils to act on their recommendations. We identified a number of supplementary rationalisation mechanisms, which would be of value irrespective of whether new organisational structures were put in place.

9. A major thrust of developments in the customer-contractor relationship since the 1971 Rothschild report has been towards increased "commercialisation". Scope remains for modifying current arrangements to permit a freer interplay of market forces. That said, there is a degree of underlying tension between the ideal of commercialism (which ultimately implies establishments should be growing, dynamic businesses capable of competing on equal terms with the private sector) and the importance of

economy, as well as efficiency and effectiveness, in public sector organisations. To resolve this tension, we suggest that strategic decisions need to be taken on whether the long-term future of individual establishments lies in the public or the private sector. The policy framework in which they operate should then be tailored accordingly.

RECOMMENDATIONS

Privatisation and Transfers to Universities

1. ADAS should be privatised, drawing upon the experience of earlier Public Sector Research Establishment (PSRE) privatisations (para 3.8).

2. DOE should review the case for moving elements of the Building Research Establishment (BRE) into the private sector, taking account of planning now under way for the Transport Research Laboratory and the National Engineering Laboratory, which conduct some similar types of activity (para 3.8).

3. Departments and Research Councils should routinely examine the potential for transferring PSREs to universities (para 3.11).

4. PSREs should, within two years, develop effective formal links with universities where these do not exist at present (para 3.12).

5. Departments should review the case for privatisation of Government Research Establishments (including both Agencies and Non-Departmental Public Bodies, to which the Prior Options process has been extended) by reference to our categorisation of activities into "front line", "immediate support" and "second line support" (para 3.13).

6. OST should establish and co-ordinate, on behalf of the Next Steps Division of OPSS and consulting HM Treasury, a formal Prior Options process for Research Council institutes and the Scottish Agricultural Research Institutes (para 3.14).

7. HM Treasury should disseminate fresh guidance on privatisation in the light of recent Departmental reviews, drawing out the differences between the various forms of privatisation (para 3.15).

8. In their responses to this report, Departments and Research Councils should publicly declare themselves open to approaches from private sector firms or universities wishing to discuss the potential for taking on some or all of the activities of individual PSREs (para 3.8).

9. Departments should treat privatisation decisions in a structured way. A strategic view, collectively endorsed by interested Departments, should be taken on whether the ultimate long-term goal for a particular establishment should be a move into the private sector or whether it should remain in the

public sector for the foreseeable future. The policy framework in which the establishment operates should be designed accordingly (para 3.16, para 7.16).

Organisational structures

10. In any new organisational structures, we suggest that most benefit will derive from combining high potential for savings and/or flexible use of resources with relative ease of strategic direction. We recommend that Ministers give further consideration to two alternative organisational models in particular, both of which would involve a number of transfers of ownership (para 5.22):

> *Model 1* the creation of four new 'market sector' oriented organisational groupings dealing with marine resources and environment; environment (non-marine); biotechnology and biological science; and food and agriculture. These would be parented, respectively, by Scottish Office, NERC, BBSRC, and MAFF;
>
> *Model 2* the creation of geographically-based groupings in Scotland and in England and Wales. This would bring more establishments in Scotland into Scottish Office ownership, create a new MAFF agency comprising most existing MAFF PSREs in England and Wales, and transfer a small number of establishments to BBSRC and NERC.

11. New Chief Executives would be required for the departmentally-parented groupings; for the Research Council-parented groupings, the role would be filled by the existing Chief Executives of the Research Councils concerned. Under either model, Chief Executives of the groupings should be given remits which ensure that rationalisation opportunities are seized between their organisations, as well as within them (para 5.25).

Alternatives to structural change

12. As an alternative to change in organisational structures, two Directors of Rationalisation posts should be created with post-holders jointly appointed by appropriate combinations of interested Departments (OST, MAFF, SOAFD, the Forestry Commission and ODA). The Directors would be charged with identifying and recommending rationalisation of capabilities and facilities within the two broad areas of (a) marine and non-marine environment (b) food, agriculture, biotechnology and biological sciences (para 6.5).

Supplementary rationalisation mechanisms

13. OST, given their oversight of the Open Market policy, should review with customer and owner Departments the scope for enhanced customer-side co-ordination consistent with continued emphasis on competition and market forces (para 6.7).

14. Agencies, in particular, should regularly produce for their owner Departments and OST 'competition assessments' on commercial lines detailing the main elements of their business, the extent to which competition exists elsewhere for particular activities, and whether those activities are "core" for the establishment and its competitors (para 6.9(a)).

15. Whenever plans are contemplated for major (over £2 million) investments such as new buildings, Departments should treat these as 'windows of opportunity' and make the detailed funding case against a background of the potential for site rationalisation with other PSREs, whether or not in common ownership (para 6.9(b)).

16. The Next Steps Division of OPSS should formally include rationalisation in applying the Prior Options process to PSREs (para 6.9(c)).

17. Customers should support and promote sub-contracting by establishments and the formation of consortia to respond to particular requirements or sets of requirements (para 6.9(d)).

18. Owner Departments should encourage their PSREs to come together in 'clubs' to consider matters of common interest, including possible rationalisations and sharing of facilities. Such clubs could be structured both functionally and geographically (para 6.9(e)).

19. HM Treasury, OST, and owner Departments should collectively review the scope for providing rationalisation incentives to PSRE Chief Executives/ Directors and their staff (para 6.9(f)).

20. For specific groups of PSREs where there is commonality of interests and/or geographical proximity, Departments should consider establishing joint resource management boards (para 6.9(g)).

Other specific rationalisations

21. There is overlap (and geographical proximity) between the MRC's Radiobiology Unit (RU) and the National Radiological Protection Board (NRPB): the Health Departments and MRC should consider bringing part of the RU and the NRPB together (para 6.10(a)).

22. The work of the Institute of Virology and Environmental Microbiology (IVEM) has strong links with that of BBSRC and MRC establishments. The case for transfer of the Institute of Virology and Environmental Microbiology (if not merged with a university) to either MRC or BBSRC should be examined by the Director General of Research Councils (para 6.10(b)).

23. There is potential for closer alignment between the Public Health Laboratory Service and the National Institute for Biological Standards and Control/NHS laboratories. This should be explored by the Department of Health in the light of the current review of the Public Health Laboratory Service (para 6.10(c)).

24. The Police Scientific Development Branch would benefit from Agency status and its incorporation into the Forensic Science Service (FSS) should be addressed by the Home Office following completion of the current review dealing, *inter alia,* with possible merger of the Metropolitan Police Forensic Science Laboratory with either FSS or the Laboratory of the Government Chemist (para 6.10(d)).

25. The scrutiny saw overlap in the fire research work of the Building Research Establishment and the Health and Safety Laboratory. Rationalisation of this activity (as well as that undertaken by the Home Office, which falls outside our scrutiny) should be jointly considered by DOE, HSE and HO in the light of the conclusions of the current DTI Deregulation Unit Review of Fire Safety (para 6.10(e)).

Commercialisation of the customer-contractor relationship

26. Departments should draw up customer checklists to ensure that external competition is the preferred method of sourcing R&D/S&T work unless strategic or practical considerations clearly dictate otherwise (para 7.2).

27. Research Councils should declare themselves open to applications from all competent suppliers, including GREs, institutes of other Research Councils, independent research associations and the commercial as well as the academic private sector (para 7.3).

28. OST should review with customers in two years' time the extent to which Higher Education Institutions are quoting for work on the same full economic cost basis as PSREs (para 7.4).

29. Departments should actively encourage staff exchanges between PSREs and headquarters, and draw directly on PSRE expertise as appropriate in the specification of requirements (para 7.5).

30. OST should reformulate the Open Market policy explicitly to encompass, in addition to competition, the encouragement of collaboration/ subcontracting by PSREs with private and public sector suppliers (para 7.7).

31. MAFF should progressively withdraw from its commitment to limit variations in its level of funding to BBSRC, replacing it within 4 years by contractual arrangements (para 7.8).

32. Departments must ensure that the owner role is clearly separated from customers and properly resourced. Owner and customers should work closely together so that a long-term view is taken of departmental needs and the part to be played in meeting them by PSREs (para 7.9).

33. All PSREs should put accounting and other systems in place to enable them to allocate accurate costings to programmes and to distinguish the non-staff element so that the cost-effectiveness of particular facilities can be identified. Capital investment decisions by PSREs should take account of the impact on costs to customers (para 7.12).

34. Departments/Research Councils should set published targets, discussed interdepartmentally, which encourage all PSREs to use the scope available to them to increase joint ventures with industry and/or universities, and to maximise commercial revenue from technologies/products generated (para 7.14).

35. All PSREs should at minimum have the flexibilities inherent in net running cost operation; those designated as privatisation candidates should be given the opportunity by owner Departments/Research Councils to become either trading funds or companies limited by guarantee (para 7.15).

Implementation

36. A co-ordinating Action Manager should be identified within the Office of Science and Technology to act as a focal point for bringing together the views expressed during the public consultation period and the responses of Departments/Research Councils (para 8.1).

37. The objective should be to have new structural arrangements in place by April 1996 (para 8.2).

38. If the non-structural approach to rationalisation is adopted, Directors of Rationalisation should be appointed as soon as possible, and in any event by April 1995 (para 8.3).

1. INTRODUCTION

Remit and Terms of Reference

1.1 The White Paper "Realising our potential: a Strategy for Science, Engineering and Technology" (Cm 2250) set out a range of policies and initiatives designed to improve the nation's competitiveness and quality of life by maintaining the excellence of its science, engineering and technology. A major theme was the need to promote a strong science base and ensure the efficiency and effectiveness of Government-funded research and development.

1.2 The White Paper indicated, *inter alia,* the Government's intention to review the scope for early privatisation of public sector research establishments (PSREs) and "the best organisational and management structures for those laboratories which are likely to remain in the public sector" (para 1.18). The general remit for the review was given in Chapter 5:

> *The study conducted in preparation for this White Paper recommended that more could be done to extend and accelerate the operation of market forces in relation to the science and technology which Government Departments commission in support of their policy, statutory, regulatory and procurement responsibilities...*
>
> *The Government ... accepts the study's findings that a fully open market for research and development, accessible to all competent suppliers, will enable Departmental customers to obtain an efficient and effective service from a broad supply base embracing both public and private sector suppliers. This will facilitate exchanges and contacts between the public and private sectors as customer Departments continue to diversify their supplier base.*
>
> *The Government believes that many of the services currently provided by its research establishments could be carried out in the private sector, and that privatisation is a realistic prospect for a number of establishments. However, there are other establishments for which privatisation is not currently a realistic option. Where establishments are to remain, for the time being, in the public sector, the Government will ensure that customers are provided with a high quality service in a way that represents best value for money. Careful consideration will*

need to be given to holding the level of any such capacity to the minimum necessary to meet Government's statutory responsibilities and other essential requirements.

The Government therefore intends to undertake a scrutiny of the public sector research establishments to review, sector by sector, the future status of establishments, looking in depth at privatisation, rationalisation, and different options for ownership. It will build upon reviews in progress, or which have recently been completed, as part of the regular appraisal and review process undergone by all Next Steps Agencies. It will also take account of special reviews already under way, such as those announced recently by the President of the Board of Trade.

The Government recognises that science and technology are integral to the missions of many Departments and that changes should strengthen the effective provision of scientific expertise and advice.

1.3 The Terms of Reference, as shown at the beginning of this report, were announced by the Chancellor of the Duchy of Lancaster on 2 February 1994.

Coverage

1.4 The ambit of the scrutiny included PSREs parented by Government Departments and related laboratories within the Research Council system in England, Wales and Scotland. Defence establishments were excluded in the light of the separate review under way within the Ministry of Defence; developments in that review were monitored by the team.

1.5 The establishments covered were announced in response to a Parliamentary Question from Mr Michael Bates MP on 3 March 1994 *(Hansard cols 809 - 811)*. The original list, reproduced at Annex A, comprised 53 establishments. As a result of mergers which have taken place since the commencement of the scrutiny, the total number is now 50.

Methodology

1.6 The review was conducted under normal efficiency scrutiny procedures. Work began, following a scoping phase, on 13 December 1993.

1.7 The Terms of Reference invited us to undertake our review on a sector by sector basis; for this purpose establishments were divided into two broad sectors, life sciences and physical sciences, though the team recognised the need to bear in mind throughout the important links between them. To assist the management of the scrutiny, topic areas—not seen as definitive or watertight—were also identified within and across sectors.

1.8 The team undertook some 90 interviews and visits to Departments, PSREs and other organisations, including private sector companies and consultants; a full list of organisations consulted is at Annex B. We obtained supplementary information through correspondence, questionnaires to establishments and Departments/Research Councils, and a review of relevant documentation. A bibliography of the main published works consulted is at Annex C.

1.9 Our emerging findings were discussed at a meeting of the Departments and Research Councils represented on the Advisory Panel for the scrutiny. We were also provided with advice from a panel of independent scientific experts chaired by the Chief Scientific Adviser. We received several written submissions from the Council of Civil Service Unions, and we also met them on two occasions, the first shortly after we began work, the second to discuss the emerging findings. As with all efficiency scrutinies, however, the report reflects the team's conclusions and recommendations in the light of the evidence we found.

The team

1.10 The scrutiny team consisted of five full-time members seconded to the Efficiency Unit from various Departments, and a part-time member seconded from the private sector:

Mrs L D Kyle	Ministry of Defence
Dr H K Wilson	Health and Safety Executive
Dr J M Davies	Scottish Office
Mr S James	Ministry of Agriculture Fisheries and Food
Dr A J Macpherson	Department of the Environment
Dr C Ovenden	Smiths Industries plc

1.11 Our contact in the Efficiency Unit was Susan Scholefield. Dr Michael Elves of Glaxo Holdings plc acted in an advisory capacity to the team.

Costs

1.12 Parent Departments met the salary and related costs of the civil servants on the team; Smiths Industries met those costs for Dr Ovenden; and the Cabinet Office provided secretarial and clerical support. All other associated costs such as travel were met by the Cabinet Office. Overall the cost of undertaking the scrutiny was approximately £157,000.

Structure of the Report

1.13 The report is structured around the main elements of our Terms of Reference:

Chapter 2: provides an overview of the establishments covered and a summary of current ownership, financing and customer-contractor relationships and funding trends;

Chapter 3:	describes the criteria against which we assessed the scope for privatisation and the privatisation candidates identified. It also makes recommendations regarding mechanisms for future consideration of privatisation possibilities;
Chapter 4:	considers the case for rationalisation of capabilities and facilities between establishments likely at present to remain in the public sector, and describes current patterns of overlap and duplication;
Chapter 5:	reviews potential changes to current organisational and management structures;
Chapter 6:	outlines alternative and supplementary mechanisms to achieve rationalisation of capabilities and facilities;
Chapter 7:	discusses a key underlying issue, commercialisation of the customer-contractor relationship;
Chapter 8:	provides a brief note on implementation.

Terminology

1.14 For the purposes of this report, we have used the definitions of scientific and technological activities, research and development, and scientific and technological services set out in the internationally agreed "Frascati Manual". We have also followed the Government's "Annual Review of Government Funded Research and Development" in dividing research into three main categories; basic, applied strategic and applied specific. Full definitions of these terms are given at Annex D.

1.15 The abbreviations "R&D" and "S&T" are used in this report to refer to the "Frascati" categories of "research and development" and "scientific and technical services" respectively. The latter term describes a distinct (though often equally challenging) type of activity from research and development; R&D may however be an important underpinning element in the provision of S&T.

Acknowledgements

1.16 We have contacted a large number of people during our scrutiny, often setting up meetings at short notice or asking for written responses to short deadlines. We are most grateful to all those who have contributed, including the private sector companies and consultants we met who had no direct interest in the outcome of the scrutiny yet were kind enough to discuss with us at some length the issues raised.

1.17 Our special thanks go to the directors and staff of establishments, who not only responded to detailed questionnaires and provided additional documentation but also took time from busy schedules to organise comprehensive briefings and discussion sessions for us during our site visits.

1.18 Finally, the team would like to thank Jackie Hartshorne, Jane Tansley, and Mary Belsey for their efficient and unfailingly good-humoured support.

2. THE ESTABLISHMENTS: OWNERSHIP, FINANCING AND CUSTOMER-CONTRACTOR ARRANGEMENTS, AND FUNDING TRENDS

Context

Science, engineering and technology are a major national resource, vital alike for wealth creation and for the wider public good

Forward Look of Government-funded Science, Engineering and Technology, 1994

2.1 Public sector research establishments (PSREs) exist for two main reasons: to provide support for the policy, statutory and regulatory activities of Government Departments; and to undertake research aimed more generally at improving wealth creation or enhancing quality of life, thus contributing to the maintenance of a strong science and technology base for the UK. While these basic objectives have remained fairly constant, organisational arrangements have evolved over time. The missions and structures of many PSREs have changed since they were established; so have those of their parent Departments and Research Councils. Annex E gives details of the size, status and current missions of the PSREs within our scrutiny; an outline of the history of individual establishments is given at Annex F.

2.2 Much of the present framework for science and technology policy and funding was put in place in the 1960s and early 1970s. The Science and Technology Act 1965 set out arrangements for funding scientific research and related activities through Research Councils; it also made specific provision for establishing the Science Research Council and the Natural Environment Research Council. In 1971 the Rothschild report laid down the principle that a customer-contractor relationship should operate for the commissioning of applied R&D to ensure a clear focus on the need for and management of specific expenditure. Rothschild distinguished in this context between basic research, where the end product was an increase in knowledge, and applied R&D where the objective was a process, product or method. He saw no analogous customer-contractor relationship applying to basic research.

2.3 During the 1980s, a number of developments within the Civil Service had an impact on the management of public sector science and technology. The Financial Management Initiative, with its emphasis on delegation of budgetary responsibility, led to increased attention to systems for managing expenditure. The use of ROAME—Rationale, Objectives, Appraisal, Monitoring and Evaluation—procedures or their equivalent led to a more systematic approach to commissioning of R&D by Departments.

2.4 With the new approach to management embodied in the Next Steps initiative, many PSREs parented by Government Departments have become Executive Agencies. The initiative also highlights the question of whether privatisation is an appropriate or feasible option for PSREs. As part of the process of reviewing an Agency, a series of "Prior Options" are considered under which Ministers decide whether the work needs to continue to be done at all and whether it could be better done within the private sector, or, if it is to remain in Government, under a private sector management contract. Only if Ministers decide against these options is the case for continued Agency status considered further. A number of Agencies are now reaching their first (three year) review stage, and the scrutiny has been able to draw on the work undertaken in this context.

So pervasive are science and technology nowadays that most Government Departments use them—to a greater or lesser extent—when exercising their policy, regulatory, statutory and procurement responsibilities

'Realising our potential", May 1993

2.5 The Next Steps initiative was accompanied by a re-statement of the customer-contractor principle in 1989 by the then Chief Scientific Adviser. The aim of this document (the "Fairclough Guidelines") was to increase the freedom of departmental customers and encourage moves towards competitive tendering: the intention was to create an internal market in which public sector suppliers would compete with one another for publicly-funded R&D/S&T. One of the results was a move by Departments away from the Rothschild report model in which Chief Scientists acted as "intelligent customers" and towards giving commissioning responsibility to policy divisions. This gave a clear policy focus to the definition of requirements and output, but also created a need for customer intelligence over a broader field. This need has been met in a variety of ways ranging from using Chief Scientist Group staff in a liaison role to embedding scientific staff within policy divisions, and from redeploying PSRE staff into headquarters to the employment of private sector scientific consultants.

2.6 The period since publication in May 1993 of the Government's White Paper on Science, Engineering and Technology has been one of particularly

Our specific policies are designed to get maximum value for money from our annual public expenditure of some £6 billion on science and technology

"Realising our potential", May 1993

active change. New Government initiatives have been implemented such as Technology Foresight and the Forward Look, while the Office of Science and Technology (OST) has been given an enhanced role in drawing such initiatives together and ensuring that cross-departmental issues are handled effectively. The Research Councils were restructured in April 1994, each with part-time Chairmen and full-time Chief Executives, revised missions and a new Director General taking an overview of their operation. The emphasis on competitive tendering by Government Departments has been reinforced and statistics on competition have been published in the "Forward Look of Government-funded Science, Engineering and Technology". Special reviews undertaken by the Department of Transport and the Department of Trade and Industry have resulted in plans for a number of privatisations; several sets of laboratories have been merged; and other reviews are in progress which could result in amalgamations or changes in status: NERC, for example, has announced its intention to bring together a number of its laboratories into new inter-disciplinary centres for Coastal and Marine Sciences and for Ecology and Hydrology. In conducting the scrutiny, therefore, we have needed to take into account the fact that we have seen a "snapshot" of an evolving scene.

The establishments and their activities

Size, status and geographical distribution

2.7 Taken together, the establishments within the scrutiny[1] employ some 31,000 staff and have total costs—including income from all sources—of some £1.3 billion (1992/3).

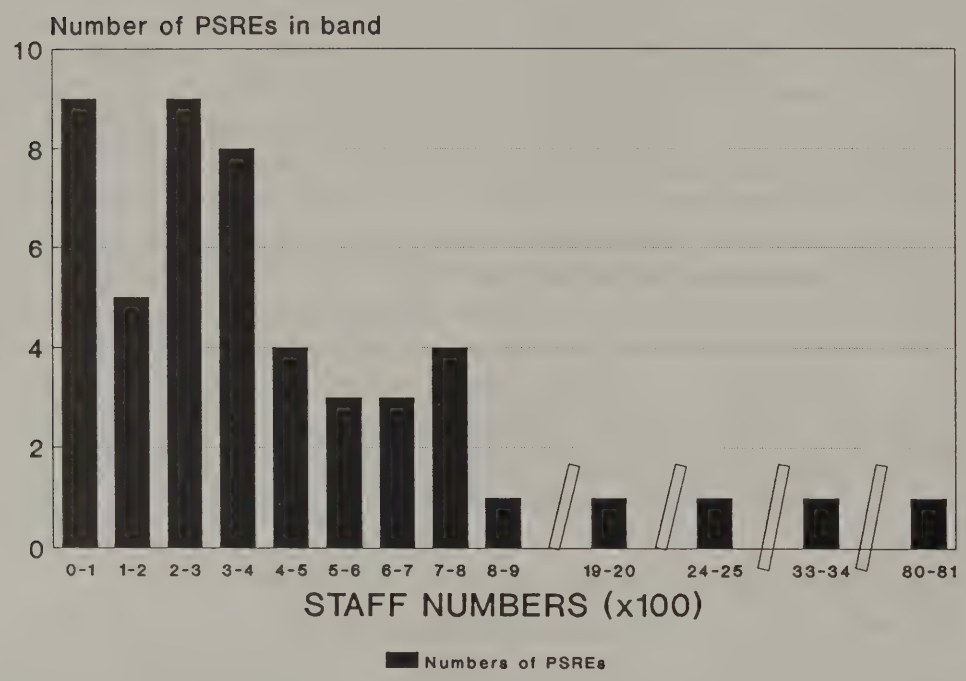
2.8 As Figures 1 and 2 demonstrate, the totals conceal wide variations in personnel numbers and in costs. The smallest PSRE in the scrutiny is the National Weights and Measures Laboratory with only 48 staff; the largest is AEA Technology, with some 8,000. The average is around 600; excluding those scheduled for privatisation—see Chapter 3—this drops to 480 staff. Nearly half the establishments are under 300-strong, and most of these have less than 200 staff.

2.9 In cost terms, annual income and expenditure averages some £27 million per establishment (£19 million excluding those scheduled for

[1] initially 53, now 50, as a result of mergers during the course of the scrutiny between SERC's Daresbury and Rutherford Appleton Laboratories, and between MAFF's Central Science Laboratory, Food Science Laboratory, and Torry Research Station.

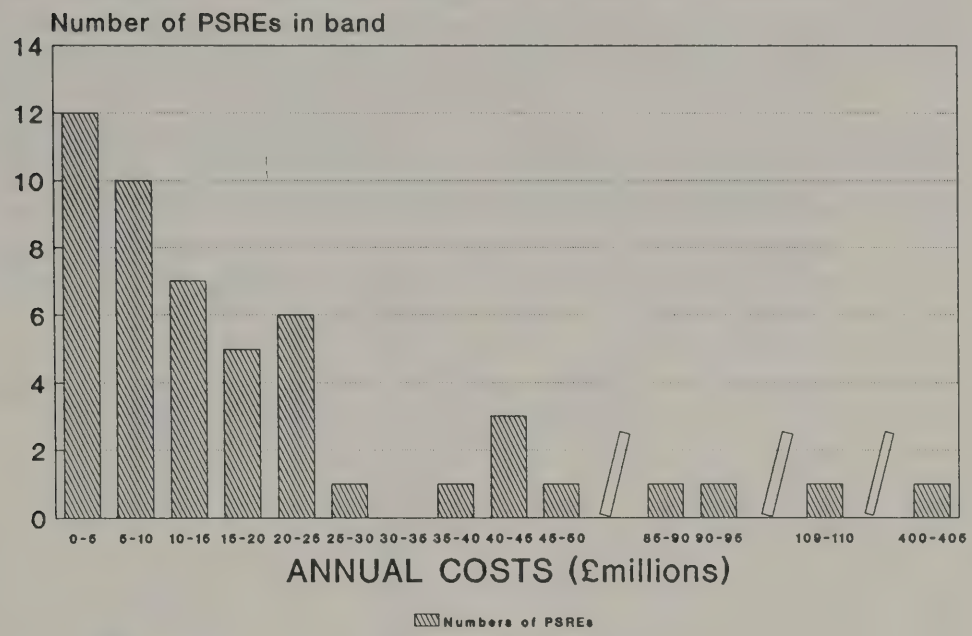
privatisation) though again this conceals major variations. 1992/93 funding for the smallest PSREs is around £2 million, while AEA Technology has a turnover of nearly £405 million. There is no consistent relationship between costs and numbers of staff: much depends on facilities, size of site, the degree of subcontracting etc.

Figure 1: Size of PSREs in the scrutiny



Source: scrutiny questionnaire

Figure 2: Annual costs of PSREs in the scrunity

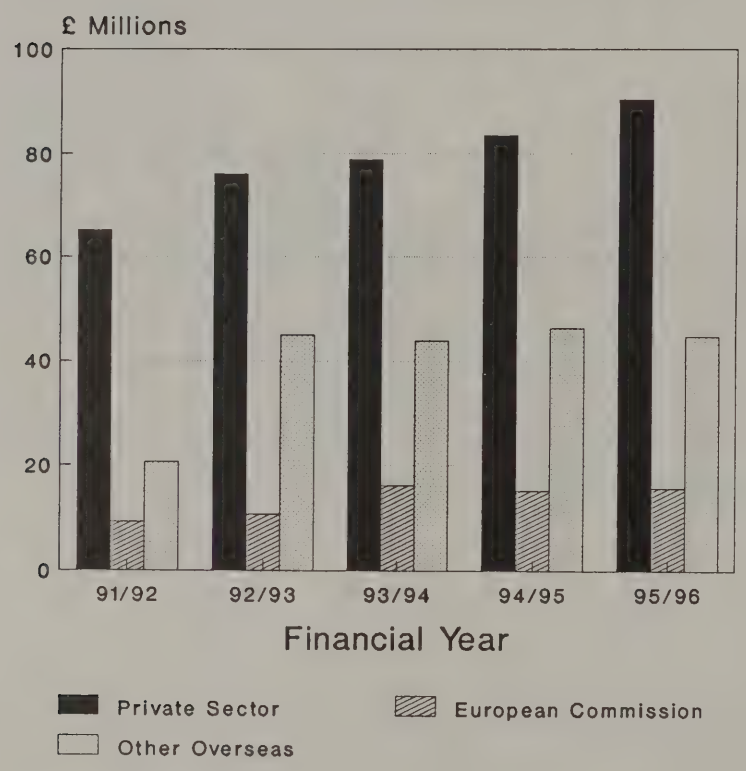


Source: Scrutiny questionnaire

2.10 Geographically, the establishments are spread throughout the UK, though there are few in the north of England (the number will be increased by the planned move to York by 1996 of MAFF's Central Science Laboratory). The map at Annex G shows headquarters and major locations. Many establishments have multiple sites: the Public Health Laboratory Service, for example, consists of a network of some 50 laboratories, while MAFF's Directorate of Fisheries Research has 4 laboratories located at Lowestoft, Weymouth, Burnham-on-Crouch and Conwy.

2.11 In status, PSREs vary from Next Steps Agencies to integral parts of Government Departments; and from non-departmental bodies with statutory functions to companies limited by guarantee and registered charities. As businesses, they exhibit widely varying cultures. Some are highly entrepreneurial in approach; this depends, more often than not, on the style of individual managers rather than the activity undertaken, ownership arrangements or legal status. Figure 3 (AEA turnover excluded to clarify the general trend) shows a small increase in the income derived from overseas or private sector sources; however, given not least that there are central policy limitations on the extent to which they can compete with the private sector, PSREs overall rely on public funds for over 80% of their income.

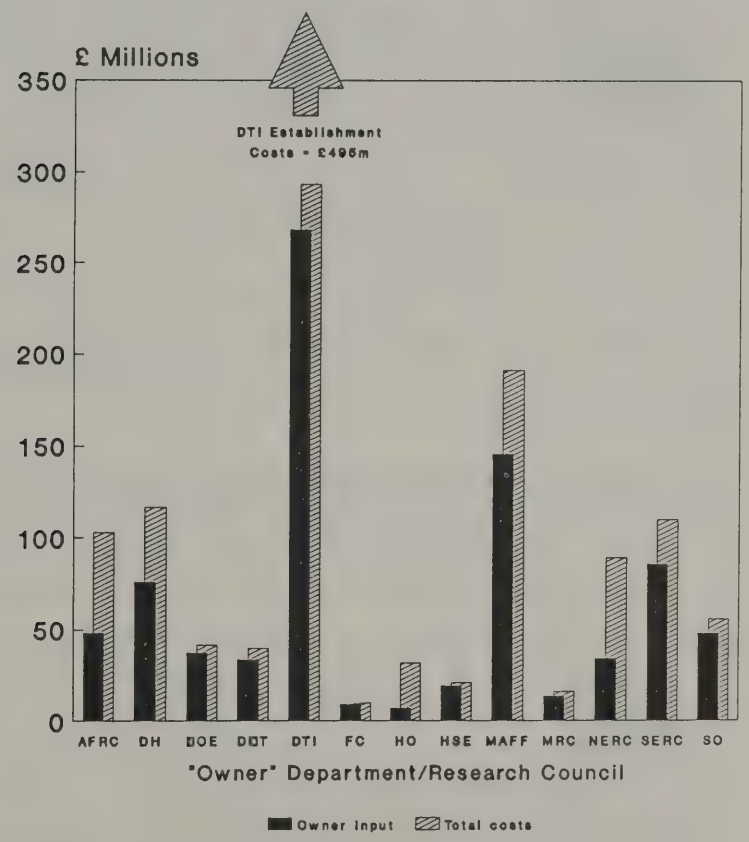
Figure 3: PSREs in scrunity – Income derived from overseas or private sector sources



Source: Scrutiny questionnaire
AEA is not included

2.12 The majority of PSRE finance comes from parent Departments or Research Councils, though again there are variations: BBSRC institutes, for example, typically obtain some 40-60% of their funding from MAFF. Figure 4 shows, on a Department/Research Council basis, the value of establishment income derived from the parent body.

Figure 4: PSREs in scrunity – income from parent body compared with total establishment costs



Data relates to 1992/93
Source: Scrutiny questionnaire

Types of activities

2.13 In terms of their activities the establishments fall into two main types:

(a) those, largely within the Research Council system, though parented in some Scottish cases by the Scottish Office, whose work is almost entirely oriented to basic and applied research. In most cases, these also undertake small-scale educational activities and have technology transfer as part of their mission.[2] Often, too, there is some private-

[2] This work was discounted in the statistics on percentage of R&D activity reflected in Annex E.

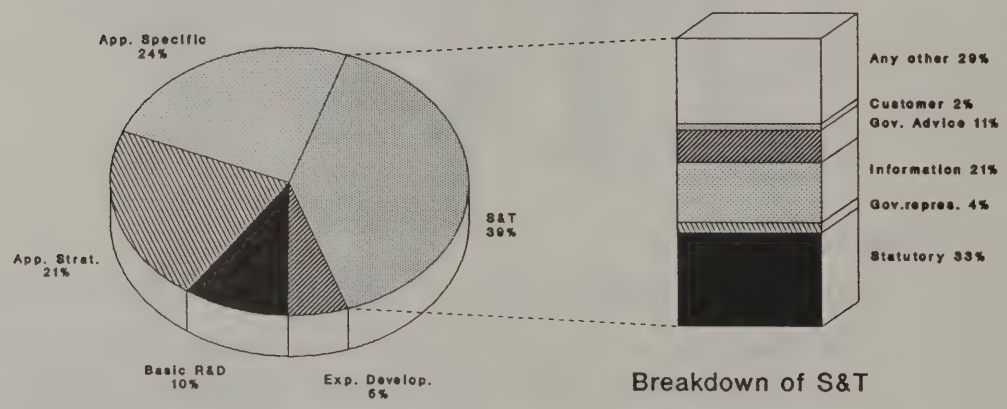
sector income from licensing of products or techniques: sometimes this is embodied in offshoot companies. We use the term Research Institutes (RIs) to refer to this category;

(b) departmentally-parented bodies for which S&T represents a substantial proportion (and in some cases the majority) of their activity. The research, in these cases, is in general applied only, and may be undertaken to underpin the establishment's S&T work or as a distinct activity responding to customer requirements. For convenience, we describe these as Government Research Establishments (GREs), although the term has traditionally been applied to only a subset of departmentally-parented bodies.

2.14 23 of the 50 establishments in the scrutiny are GREs on this basis, and 27 are RIs. Figures 5, 6 and 7 describe the breakdown of R&D and S&T activities overall and for each of these types of PSRE. The small amount of basic research shown for GREs (Figure 6) relates to Horticulture Research International, a MAFF-sponsored NDPB formed recently from an amalgamation of MAFF and AFRC PSREs. The similarly small proportion of S&T shown for RIs (Figure 7) includes work at several establishments on database and consultancy activities and on the maintenance of disease containment facilities.

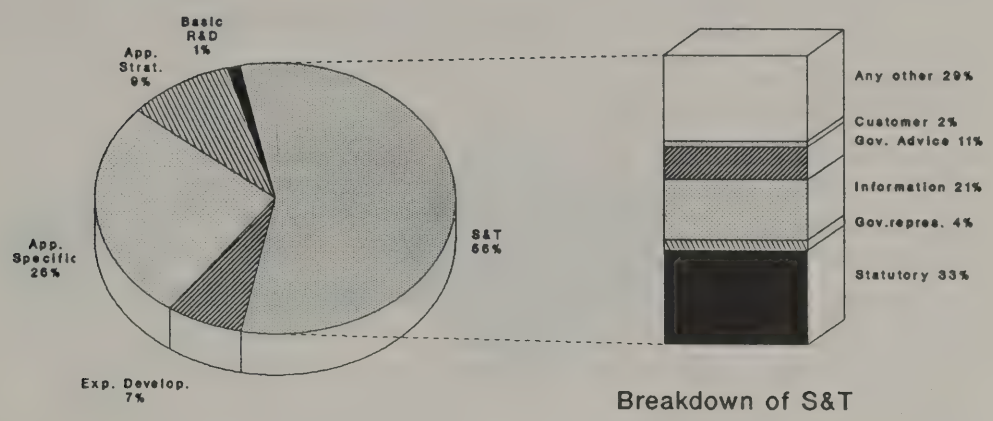
2.15 Approximately half the staff in GREs and approximately three-quarters of those in RIs are directly engaged on R&D/S&T (see Figure 8). A wide range of activities is included in the "other" category, from farm workers to marketing managers, and from accountants to data processors.

Figure 5: Breakdown of R&D and S&T activities of PSREs in the scrunity



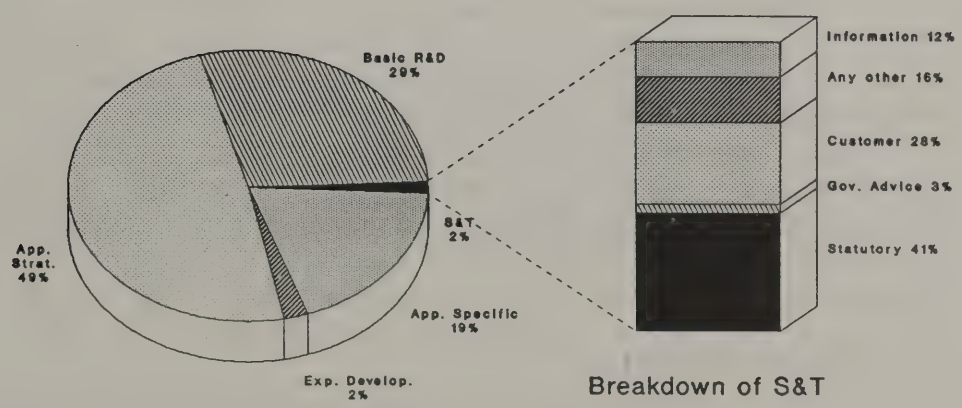
AEA not included
Percentage by value for 1992/3
Source: Scrutiny questionnaire

Figure 6: Breakdown of R&D and S&T activities of GREs in the scrunity



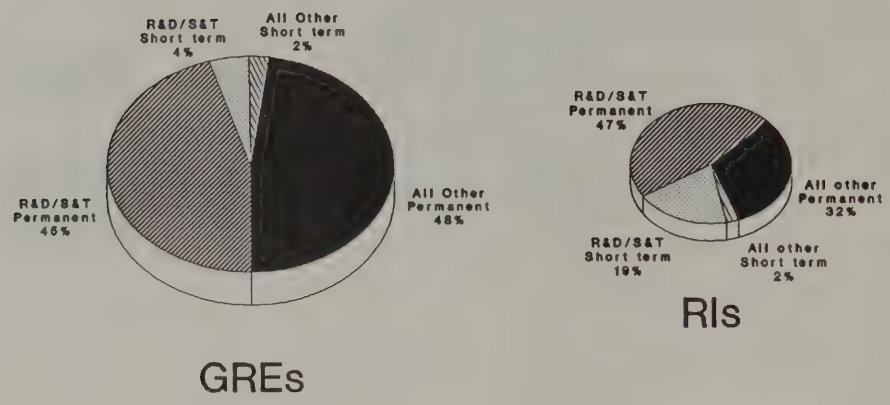
AEA not included
Percentage by value for 1992/3
Source: Scrutiny questionnaire

Figure 7: BreaKdown of R&D and S&T activities of RIs in the scrunity



Percentage by value for 1992/3
Source: Scrutiny questionnaire

Figure 8: Categories of staff in PSREs covered by the scrunity



Reflects activities rather than qualifications
Source: Scrutiny questionnaire

2.16 The preceding figures demonstrate that while there is a basic difference in *raison d'être* of GREs and RIs, there is a degree of overlap in types of activities undertaken. The dividing line between the work of GREs and that of their parent Departments is also not a hard and fast one (nor is it the same in all cases). The S&T performed for Departments[3] can, in this context, usefully be categorised into "front-line operational/policy" and "support to operations/policy", a categorisation further described in Annex H.

Markets/mission areas

2.17 Of the 50 (initially 53) establishments covered by this scrutiny, 35 (originally 37) can be categorised broadly as dealing with 'life sciences' and 15 (originally 16) as dealing with 'physical sciences'. In terms of market or user-community orientation they present a complex and interwoven picture, illustrated diagrammatically at Annex I.

[3] GREs also undertake S&T for non-Government customers, either as part of their official role or as a spin-off from it.

Ownership and Financing Arrangements

2.18 We have taken ownership in the broad sense of "parenting", which includes sponsorship of Non-Departmental Public Bodies (NDPBs). Ownership arrangements fall into the following broad types:

(a) where the establishment forms part of or is sponsored by an NDPB established to carry out functions (often statute-based) relating to the aims of a Department. The Research Councils (parented by OST), the Health and Safety Executive (parented by the Department of Employment) and the Department of Health NDPBs are bodies of this type. The departmental function here is sponsorship of the NDPB. For the PSREs of the Research Councils and the Health and Safety Executive in particular, it is appropriate to view the NDPB, rather than the ultimate sponsor Department, as fulfilling the parent role for the establishment. Research Councils both own and sponsor PSREs, while the Health and Safety Laboratory is currently an integral part of HSE, although there are plans to give it 'agency' status;

(b) where the PSRE is itself an NDPB which was not established to carry out specific functions on behalf of Government. Such bodies are frequently "private sector style" organisations (eg company limited by guarantee or friendly society). The Scottish Office sponsorship of the Scottish Agricultural Research Institutes falls into this category;

(c) where, as in the case of most GREs, the PSRE is an Executive Agency of the parent Department. The relationship here is 'owner' rather than 'sponsor';

(d) where the PSRE is an integral part of a Government Department.

2.19 Financing arrangements for establishments depend on the ownership arrangements. Departments in general grant-fund NDPBs in relation to a statement of the services to be provided in the form of a service level agreement, Memorandum of Understanding (MOU) etc. Where the PSRE is an integral part of a Department, it will be funded as part of the departmental Vote. Most of the agencies within the scrutiny are funded on a net running cost basis. There is also one example in our scrutiny (AEA Technology) of a statutory corporation with trading fund status.

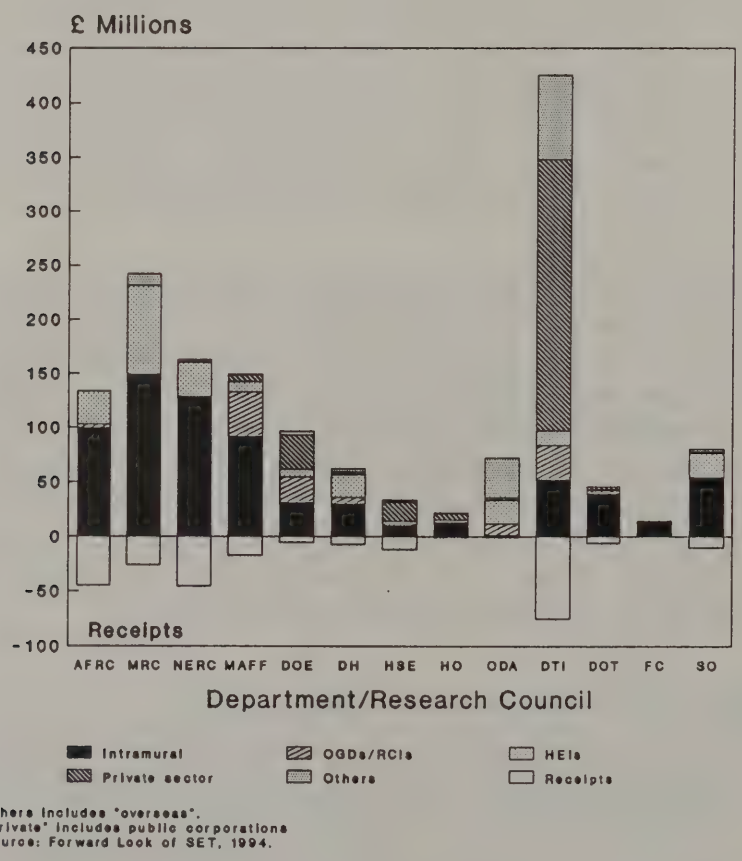
Customer-Contractor arrangements

2.20 Customer-contractor arrangements do not "map" precisely onto ownership arrangements. Elements of the parent Department normally have a customer-contractor relationship with the Department's PSREs, though under the arrangements described in paragraph 2.18(a) it is, for example, the Research Councils, not OST, which have this relationship with Research Council institutes. In addition, as Figure 4 shows, many PSREs provide

services to more than one Department. There are some, relatively explicit, limitations on the extent to which GREs are permitted to compete for work for Departments other than their parent. We saw an example in the Health and Safety Laboratory: this restriction should however be set in the context that HSE itself acts on behalf of 7 Ministers, so in undertaking work 'for' HSE, HSL is in practice acting for a wider variety of customers.

2.21 PSREs are, moreover, by no means the sole source of the R&D/S&T commissioned by Departments and Research Councils. Overall, some 47% of Government civil R&D expenditure is with Higher Education Institutions and 12% with industry and public corporations (source: Table 1.3.8 of the "Forward Look"). Figure 9, based on statistics published in Part 2 of the "Forward Look", gives details of values of Departmental/Research Council 'intramural' and 'extramural' expenditure for 1992/3.

Figure 9: Destination of Department and Research Council R&D/S&T Expenditure (1992/93)



Others includes "overseas".
"Private" includes public corporations
Source: Forward Look of SET, 1994.

Basic research is, by definition, research without a specific end in view and here the market does not operate

"Realising our potential", May 1993

2.22 There are, in general, two main types of public sector customer-contractor relationships:

(a) those between Research Councils and RIs;

(b) those between Departments and RIs/GREs.

2.23 We found relatively few examples of a customer-contractor relationship between Research Councils and GREs, though some work is placed by NERC with, for example, the Defence Research Agency and the Meteorological Office and by MRC with DoH NDPBs.

2.24 RIs are essentially core- or grant-funded by Research Councils to undertake broad areas of research. The customer-contractor relationship is based on strategic definition of areas of interest at the Research Council level and a process of peer-group review (including assessment by visiting groups of eminent scientists and industrialists) to ensure continued validity and high standards. Beyond this, there are more specific awards made by Research Councils in response either to approaches from researchers or as a result of open invitations. In general, however, we found that Research Council Institute directors were not encouraged to compete for such responsive work: in some cases it is only open to universities. We also heard that some RIs had found it difficult to obtain funding from Research Councils other than their parent. The MRC seems to be more open than the other Research Councils in this regard.

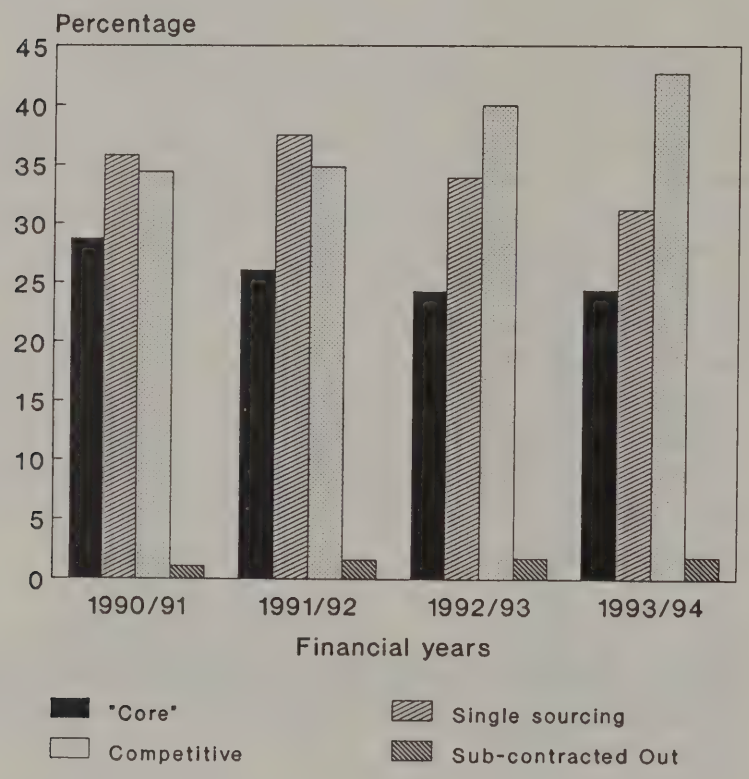
Agency status has allowed the Laboratory to develop significantly in the organisation of its business on commercial lines whilst continuing to serve the needs of the Ministry

Agency Chief Executive

2.25 Within Departments, we have found, for the most part, that policy divisions have delegated budgets. For R&D, establishments respond to individual customer requirements, normally specified through the ROAME system or a variant. For S&T, there may be more general service level agreements, which resemble call-off contracts. The level of definition in the specifications varies: in general, efforts are being made to increase the degree of detail. The main exceptions to the principle of delegated customer

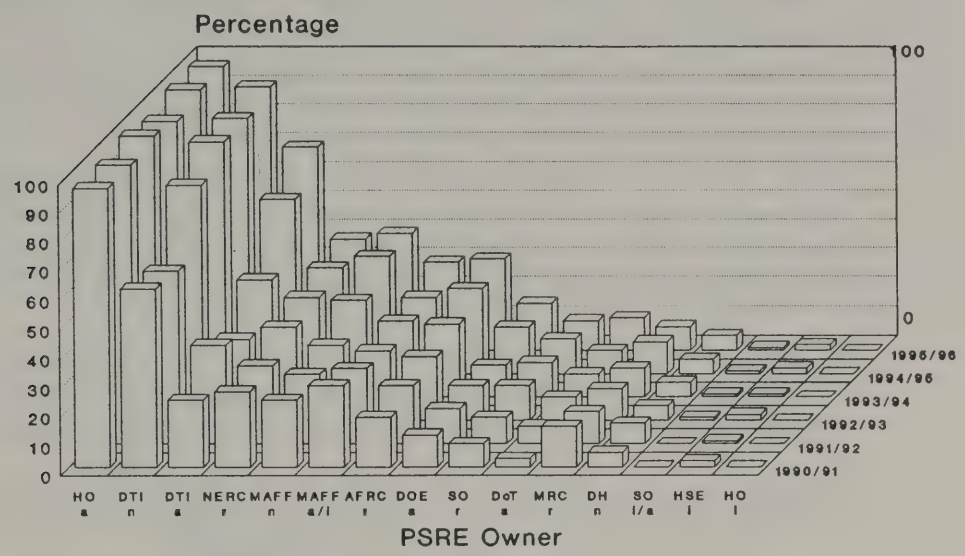
budgets arise where the PSRE forms part of a Department, though even here there may be 'shadow' customer budgets. Plans for Agency status should change this—there is general agreement that Agency arrangements have been a major step forward in strengthening customer-supplier arrangements. Considerable efforts are being made to introduce greater competition. The effects are still working through, as delegated budgets have, in general, only been in place for two or three years. As Figures 10 and 11 demonstrate, however, the proportion of establishment income deriving from competition is generally increasing.

Figure 10: PSREs in scrunity – Proportion by value of core, competitive and single source funding



Source: Scrutiny questionnaire

Figure 11: PSREs grouped by owner – Percentage of income, by value, gained through open competition



KEY: i=in-house; r=RI; a=agency
n=NDPB.
SOURCE: Scrutiny questionnaire

2.26 Apart from the "contractual" relationships between Departments and PSREs, there are, in addition, three rather different types of arrangements:

(a) SOAFD, which parents the SARIs, commissions all R&D including basic work through ROAME as well as using visiting group procedures;

(b) the Department of Health gave back to the Medical Research Council its "Rothschild money" (the money transferred from Research Councils to Departments for applied R&D following the Rothschild report)[4] and exercises its customer role for work in RIs by participation in the work of MRC (and other RC) committees under concordat arrangements;

(c) MAFF retained the Rothschild money transferred from the Agricultural Research Council and has a commissioning arrangement with BBSRC under which work is specified through ROAME procedures. An MOU provides the framework within which the commission is managed. Changes to the commission can be made by a mutual agreement between the two parties.[5] This arrangement is separate from the individual contracts which MAFF places with particular BBSRC institutes.

[4] This action resulted from a recommendation by the PAC in their 1979/80 session that "the Government should give full weight to the possibility of abandoning the full commission arrangements . . . if they add nothing to the guidance and advice which the Health Departments could in any case continue to provide through the improved arrangements for consultation and liaison with the MRC."

[5] There is an unwritten agreement that the amount of work removed from the commission to put to open competition will not exceed 7% of the total commission with an individual institute in any one year.

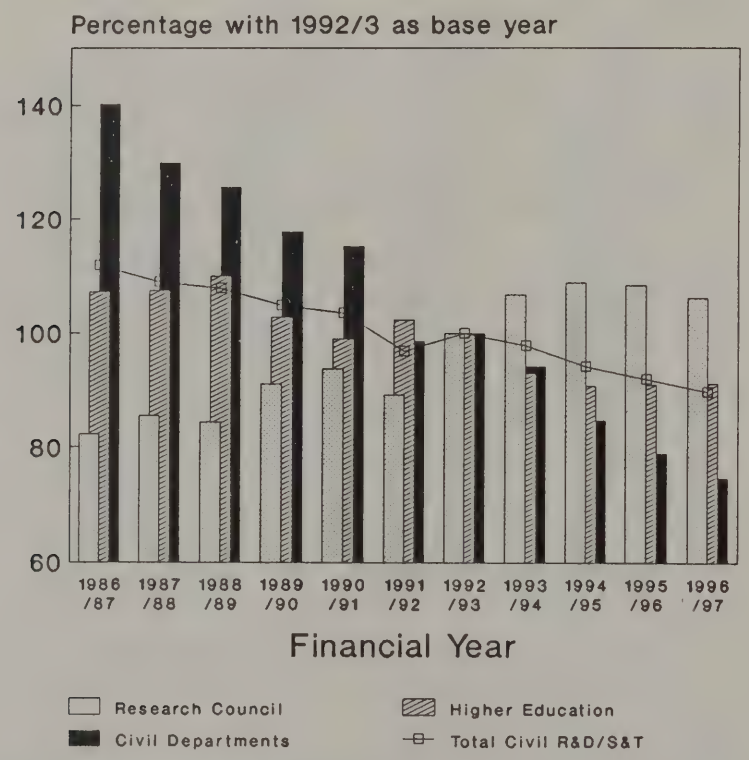
Funding trends

2.27 Since the mid 1980s, there has been a downward trend in net Government expenditure on R&D/S&T measured at constant prices. Statistics drawn from the Government's "Forward Look" show that expenditure on civil R&D/S&T was 10% lower in real terms in 1992/3 than the peak level in 1986/7; from 1992/3 to 1996/7, it is expected to decline by 13%.

2.28 Within this total, expenditure by the Research Councils has been increasing. Research Council expenditure rose by some 20% between 1986/7 and 1992/3, and from 1992/3 to 1996/7 it is planned to rise again by 6% (though from 1993/4 to 1996/7 it is steady).

2.29 Expenditure by civil Departments is, on the other hand, declining rapidly; by 29% from 1986/7 to 1992/3, with plans for a further fall by 1996/7 of 25% of the 92/3 level. Figure 12 illustrates the percentage changes.

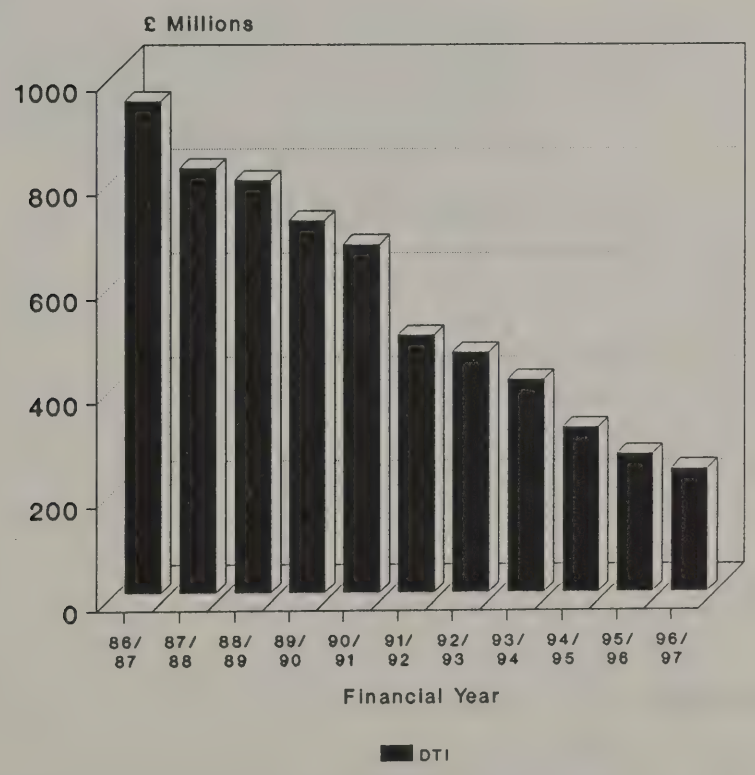
Figure 12: Government-funded Civil R&D/S&T – Changes 1986/87 to 1996/7



Source: Forward Look of Government-funded SET, 1994
Based on expenditure in real terms

2.30 Most of the reduction in civil Department expenditure is attributable to DTI (including the former Department of Energy), where expenditure in real terms has reduced from £946.1 million in 1986/7 to £462.5 million in 1991/2 and is planned to reduce again to £237.5 million in 1996/7 (all figures at 92/3 prices). This decline, illustrated at Figure 13, is due in part to the changing responsibilities of the Department; to the success of Launch Aid, which increasingly contributes significant receipts; and to the closure of the nuclear fast reactor programme.

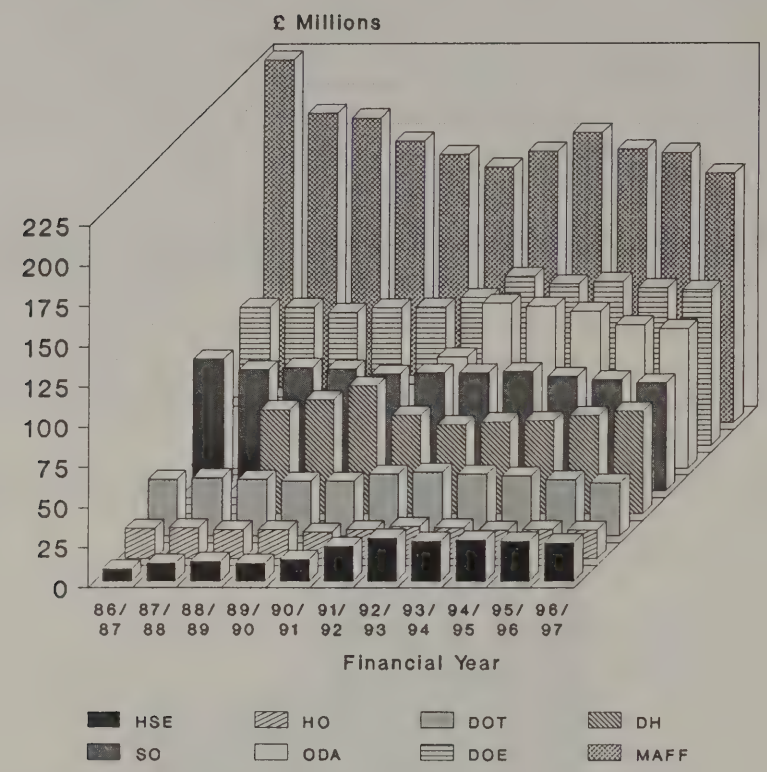
Figure 13: Changes in Department of Trade & Industry Expenditure on R&D/S&T 1986/7 to 1996/7



1986-1992 includes Dept of Energy.
Expressed in real terms with 1992/93 as base year. Source: 1994 Forward Look

2.31 The downward trend is less marked for other Departments over the same period; some, indeed, show an increase (see Figure 14). For the most part, however, Departments are forecasting reductions in net expenditure in 1996/7 as compared with 1992/3: with the exception of DH, the percentage decrease is between 8% and 17%.

Figure 14: R&D/S&T Expenditure by civil Departments for 1986/7 to 1996//



DTI not included. No DH data pre-1988
Expressed in real terms with 1992/3
as base year. Source 1994 Forward Look.

Comment

2.32 The PSREs covered by the scrutiny present a diverse picture. Emphasis on the customer-contractor principle is likely to lead to continued efficiency enhancements, as are a number of the changes introduced by the 1993 White Paper on science, engineering and technology. However, trends in departmental expenditure on R&D/S&T imply a need for further action to ensure that capacity remains in line with demand. Subsequent chapters consider the possible components of such action highlighted in our Terms of Reference.

3. PRIVATISATION

Background

3.1 Our Terms of Reference require us:

— to identify those public sector research establishments where early privatisation is feasible and desirable.

The Government believes that many of the services currently provided by its research establishments could be carried out in the private sector

"Realising our potential", May 1993

3.2 We were asked in this context to consider what characteristics of the market and/or the establishment indicate that an establishment is an early candidate for privatisation (which we define to mean privatisation within three years); and what candidates can be identified beyond those identified by Departments. Privatisation in this context is transfer of control and risk to the private sector: many PSREs in the scrutiny are companies limited by guarantee and are thus "private" in form, but liability and control lie at least in part in the public sector.

3.3 The criteria we have identified are at Annex J; they concern:

(a) the nature of the activities undertaken;

(b) the degree of Government control which would be required over the output of the resulting private sector organisation; and

(c) the extent to which the establishment is in shape to thrive in the private sector.

To be privatised, establishments need to be viable business units

Private sector consultant

3.4 In defining the criteria, and in assessing establishments against them, we have taken account both of previous similar privatisations and of the work undertaken in special departmental reviews and Prior Options assessments. There has in particular been full transparency between our analysis and the reviews undertaken by the Department of Transport and the Department of Trade and Industry, the results of which were announced during the course of our scrutiny.

Candidates

Once [these laboratories] are set free from the constraints of operating within Government, they will be better able both to serve their existing customers and to market their services to new customers, above all in industry

DTI announcement

3.5 Departmental reviews have identified a number of privatisation candidates: AEA Technology, the National Engineering Laboratory (NEL), the Laboratory of the Government Chemist (LGC), and the Transport Research Laboratory (TRL). The President of the Board of Trade has also announced his plans for a GOCO (Government-owned-contractor-operated) arrangement for the National Physical Laboratory, which may lead to NPL moving out of Government ownership in the longer term.

Some forms of privatisation could be attractive provided full and fair competition was guaranteed

Institute Director

3.6 Of the other establishments reviewed, the scrutiny found that, in general, either the mix of activities includes work which would only with difficulty be privatisable or the organisation is not in shape for privatisation: often both. That said:

(a) the establishment which comes closest to meeting the criteria in Annex J is ADAS, currently a MAFF-parented net running cost Agency. A major task of ADAS is the provision of consultancy services to farmers, a task which has parallels in the private sector. Financial problems as a result of ADAS' inability to recover full costs for some consultancy services could be overcome with the freedom to operate commercially in this area. We note that one issue is whether the R&D element of ADAS' activities should be treated as privatisable alongside its consultancy activities. We would see this as beneficial; it has certainly been viewed as such in some similar privatisations in the past;

(b) it may be possible to create a privatisable entity by removing the less readily privatisable activities. An example which should be given further detailed examination is DOE's Building Research Establishment (BRE), also a net running cost agency, which has a combination of policy and commercial-type activities (DOE have assessed that 36% of BRE's staff effort goes on work which would otherwise have to be undertaken in the parent Department);

(c) it may not always be necessary to get establishments in shape in order to privatise them if there is sufficient synergy between their activities and that of existing organisations within the private sector. If Departments/Research Councils declare themselves open to approaches, there may well be some private sector interest, including (see paragraphs 3.9 *et seq*) from universities.

3.7 The establishments listed in paragraph 3.5, together with ADAS and BRE, represent a very considerable proportion of the establishments within our scrutiny: their annual costs amount to nearly 50% of the total for the PSREs covered.

3.8 **We recommend:**

- **that ADAS should be privatised, drawing upon the experience of earlier PSRE privatisations;**
- **that DOE review the case for moving elements of BRE into the private sector, taking account of planning now under way for TRL and NEL, which conduct some similar types of activity;**
- **that in their responses to this report, Departments and Research Councils should publicly declare themselves open to approaches from private sector firms or universities wishing to discuss the potential for taking on some or all of the activities of individual PSRES.**

Transfers to Universities

3.9 Transfer to a university is a form of change of status not usually thought of as privatisation, but one which can reasonably be described as such. We discussed a number of possible candidates in the course of the scrutiny, including NERC's Institute of Virology and Environmental Microbiology (potentially to the University of Oxford) and ODA's Natural Resources Institute (potentially to the University of Greenwich). The latter proposal is currently being actively explored: we understand that other universities have also expressed an interest in NRI.

Transfer to a university could enhance "output and quality .. career structure .. flexibility for funding selected core work"

Institute Director

3.10 We have indications that there could well be interest if Departments/ Research Councils declared themselves open to approaches from universities. The benefits of such moves could be considerable, though they would have less to do with the introduction of commercial disciplines and freedoms[6] than with synergy between the organisations so merged. We were

[6] Universities do however have access to some sources of eg charitable funding which are not open to public sector establishments.

impressed, in this context, by the degree of university/PSRE integration exhibited by the MRC units within our scrutiny.

3.11 **We recommend that Departments and Research Councils routinely examine the potential for transferring PSREs to universities.** This should be done as part of the extended Prior Options process recommended below.

3.12 There is, in any event, scope for closer relationships between PSREs and universities. **We recommend that PSREs should, within two years, develop effective formal links with universities where these do not exist at present.**

Longer Term Considerations

For R&D there is no problem with work being done in the private sector, but for much of the S&T very real conflicts of interests are seen

Senior departmental official

3.13 We have found that there are variations in Departmental approaches to the Prior Options process as it affects PSREs. **We recommend that Departments review the case for privatisation of GREs (including both Agencies and NDPBs, to which the Prior Options process has been extended) by reference to the categorisation of activities into "front line", "immediate support" and "second line support" described in Chapter 2 and Annex H.** The aim here would be to determine which activities are closest to core departmental responsibilities, and which are necessary to provide underpinning support. Such an analysis will provide a model of the core work of the establishment against which its privatisation in whole or in part can be measured. It will also focus attention on the extent to which, if the establishment is to remain in the public sector, individual activities can be contracted out.

3.14 We also see benefits in introducing a modified form of Prior Options review for Research Council Institutes. The recent extension of the Prior Options process would in principle cover the SARIs as "stand-alone" NDPBs, but not necessarily the RCIs, as subsidiary elements of the Research Councils. We are aware that the potential for dissolving institutes/units is regularly examined by individual Councils. But there is scope for introducing a consistent approach across RIs and for ensuring that all options - including transfers to universities, 'commercial' privatisation and contracting out - are formally considered. OST would be well placed to undertake this task. **We recommend, therefore, that OST, on behalf of the Next Steps Division of OPSS, and consulting HM Treasury, establish and co-ordinate a formal Prior Options process for the Research Council Institutes and the Scottish Agricultural Research Institutes.**

Change to a limited private company wholly owned by another commercial organisation would change totally the ethos of the institute. The long-term strategic science objectives would be eroded progressively

Institute Director

3.15 In the course of our scrutiny, we have found a wide range in awareness of the different forms of privatisation (trade sale, flotation, non-profit distributing company etc) and the extent to which concerns over, in particular, the continued independence and impartiality of advice could be met within these. Departments which have recently undertaken special reviews of their establishments are, understandably, best informed. **We recommend that HM Treasury disseminate fresh guidance on privatisation in the light of recent Departmental reviews, drawing out the differences between the various forms of privatisation.**

If a private sector company were hoping to sell off one of its subsidiaries it would not be starving it of cash—it would be doing everything it could to make it attractive

Agency Chief Executive

3.16 It has also been brought home to us forcibly that a number of existing policies and Government accounting practices may place obstacles in the way of privatisation. Treasury guidelines on "Selling Government Services into Wider Markets" were one example highlighted by the 1993 Levene/Stewart report. These limit the scope for selling services outside Government to areas where, *inter alia*, this would result in a better public service within the core objectives of the organisation and existing assets would be used which cannot be disposed of. Where privatisation is in prospect, establishments may expand their customer base without reference to these limitations; the problem is that the guidelines may make it difficult for a PSRE to *become* identifiable as a privatisation candidate. Ill-considered contracting out, for example, may also reduce the critical mass of an organisation to a level below that at which it could survive in the private sector. **We recommend that decisions on privatisability should be treated in a structured way. A strategic view, collectively endorsed by interested Departments, should be taken on whether the ultimate long-term goal for an establishment should be a move into the private sector. The policy framework in which it operates should then be designed to facilitate this.**

Overview

3.17 Our general conclusion is that, as foreshadowed in the White Paper, early privatisation is a possibility for a number of establishments, and over the longer term further candidates could well be identified. Given the nature

of the activities undertaken by public sector research establishments, mergers with or transfers to universities are a particularly fruitful area for exploration. There is a need for a strategic approach to be taken on privatisation candidates, and for procedural modifications to ensure consistency between departmental assessments.

4. THE POTENTIAL FOR RATIONALISATION OF CAPABILITIES AND FACILITIES

Background

4.1 Our Terms of Reference require us:

> "where early privatisation is not feasible or desirable, to identify the potential for rationalisation of facilities or capabilities, and recommend means of implementing such rationalisation".

Careful consideration will need to be given to holding the level of .. capacity to the minimum necessary to meet Government's statutory responsibilities and other essential requirements

"Realising our potential", May 1993

4.2 This part of the report looks at the case for rationalisation of facilities or capabilities; and outlines the areas in which we see the greatest potential for savings and/or flexible use of resources. Implementation options are described in Chapters 5 and 6.

The case for rationalisation of capabilities and facilities

4.3 There has been substantial rationalisation within the civil R&D/S&T sector in the past decade: the Agricultural and Food Research Council for example had come down from 6300 staff in 1983 to 3500 at the time of its incorporation into the Biotechnology and Biological Sciences Research Council. The PSREs within the scrutiny still, however, present a very diverse picture in terms of size, status, ownership and geographical distribution. Moreover, the existence of overcapacity is, as the Levene/Stewart report said, "widely admitted". To quantify this on a sectoral basis would require a detailed analysis of future expenditure plans and alternative—including European—sources of supply, but we have seen evidence of it in the form of under-utilised buildings or sites (the National Physical Laboratory/National Weights and Measures Laboratory/Laboratory of Government Chemist site at Teddington is a clear example).

4.4 Beyond this, as Chapter 2 describes, Research Council expenditure is increasing, but future projections show a continued downward trend in real terms in Government Department expenditure on civil R&D/S&T. Given policy constraints on competition for non-Government business, PSREs

remaining in the public sector are likely to remain primarily dependent on Government funding. This means that GREs in particular can expect to see their traditional markets decline, but RIs—particularly those which receive a large proportion of their funding from Departments—will also be affected. Continued emphasis on the Open Market and on widening the supplier base for Government R&D/S&T implies, moreover, that a decreasing proportion of public sector requirements will need to be met by PSREs.

4.5 Unless, then, measures are taken to reduce the size and cost of the public sector supply base, there is a real risk that funding will increasingly be devoted to overheads rather than to the delivery of good and effective science.

4.6 Rationalisation hitherto has tended to take place on a departmental or individual Research Council basis[7]; and one of the important consequences of the 1993 White Paper on science, engineering and technology was the appointment of a Director General of Research Councils able to look at issues of economy, efficiency and effectiveness across Research Council boundaries. The scope for rationalisation of capabilities and facilities (a) across Departments and (b) between Departments and Research Councils needs to be explored if Government expenditure on science and technology is to achieve best value for money.

Areas of current duplication and overlap

4.7 Against this background, we were asked to consider, as an indicator of potential rationalisation, current areas of duplication and overlap between PSREs. Our detailed conclusions, based on our site visits and an analysis of responses to our questionnaire to establishments, are described in Annex K, with supporting information in Annexes L and M.

There probably are too many separate establishments in the life sciences

Institute Director

4.8 We found greatest scope for savings/ flexible use of manpower in the life sciences sector, where there are a large number of establishments with missions which, to a greater or lesser extent, overlap. The potential is less in the physical sciences field, primarily because there are fewer establishments, and of these several are now scheduled for privatisation.

4.9 We found the highest concentrations of overlap in four main areas:

— Marine Resources & Environment: an area comprising the MAFF and Scottish Office fisheries laboratories and the marine environment laboratories of the Natural Environment Research Council;

[7] there is one example within our scrutiny—the creation of Horticulture Research International—which resulted from rationalisation across a Department/Research Council boundary.

— Environment (non-marine): current NERC non-marine environment establishments, the Macaulay Land Use Research Institute and the Forestry Commission Forest Research Stations;

— Biotechnology/Biological Sciences: an area comprising the remaining Scottish Agricultural Research Institutes, the BBSRC Institutes, the MAFF-sponsored Horticulture Research International, and ODA's Natural Resources Institute;

— Food & Agriculture: other MAFF-sponsored establishments and the Scottish Agricultural Science Agency.

4.10 These areas are not exclusive: scope for savings/flexibility also exists across them, and outside the four main areas shown. **To maximise economy and efficiency in the provision of public sector R&D/S&T, we conclude that a high priority should be given to the development of structures and/or mechanisms to rationalise capabilities within and across the areas of most concentrated overlap.**

5. OWNERSHIP AND ORGANISATIONAL STRUCTURES

Background

5.1 Our Terms of Reference require us:

— to consider whether changes to current ownership and financing arrangements for establishments would lead to more effective operation of the open market and better value for money; if so, to recommend one or more alternative models.

5.2 We were asked to consider, in particular, the central non-customer ownership model recommended by the 1993 Levene/Stewart report; ownership by Departments not currently the parents/sponsors; and joint ownership by two or more Departments. Current ownership/financing arrangements for establishments are described in Chapter 2. "Ownership" here, as elsewhere, is taken to include sponsorship of NDPBs.

Role of the owner

5.3 We see the owner as having three main responsibilities:

(a) to act as a focus for Ministerial accountability;

(b) to supply strategic direction to the organisation;

(c) to provide 'basic' funding, the costs of which are then offset as far as possible—the proportions will vary depending on the type of PSRE—by the winning of contracts from internal or external customers.

The responsible owner should know what the establishment is doing, who its [internal] customers are, and how they stack up against what the establishment is doing for other Departments

Agency Chief Executive

5.4 Of these, it was the responsibility at 5.3(b) which was highlighted in two reports on relations between Agencies[8] and Departments (the Fraser and Trosa reports). The Fraser report commented in relation to Agencies providing specialist services that in the owner role, the Department needed

[8] Not all PSREs are, of course. Agencies, but the general principles are more widely applicable.

to "focus on monitoring the Agency's financial performance, quality of service and value for money and on promoting its development, both with regard to the scope of its work and the breadth and diversity of its customer base. It must also balance the long term needs of the Agency against the often shorter term requirements of its customers". The report also pointed out that the strategic task is easier to the extent that the owner and the Agency share common aims.

Joint ownership

5.5 The only examples we have found of joint ownership tend to be lead ownership/joint reporting mechanisms. ADAS (jointly owned by MAFF and the Welsh Office) receives its institutional funding through MAFF; the Forestry Commission is a Department jointly reporting to three Ministers, but it receives a single stream of PES funding; the Health and Safety Executive is a Department of Employment NDPB, but provides services to a number of Ministers. There are, however, one or two examples of multiple funding streams: the National Radiological Protection Board and the Public Health Laboratory Service (parented by Department of Health) receive a small proportion of running costs direct from the Scottish Home and Health Department and the Welsh Office respectively. As a matter of general principle, formal joint ownership is seldom a favoured option as it can cloud Ministerial responsibility and accountability.

Objectives of changes in ownership

5.6 The Levene/Stewart report identified three main objectives for changes in current ownership arrangements:

(a) to provide an improved ability to rationalise Government-owned science and technology capacity with a view to:

— achieving more science for a given level of expenditure;

— bringing together currently fragmented capabilities; and

— creating greater flexibility to respond to changing customer-driven priorities;

(b) to permit a clear customer-contractor separation, thereby increasing the customer's freedom of choice in the sourcing of requirements; and

(c) over the longer term, to increase the scope for privatisation.

5.7 We would add to this list the advantages provided by larger organisational structures in terms of consistency of management; economy of scale in support services and use of accommodation; more flexible use of manpower; and improvements in career opportunities for scientific and technical staff, which could benefit both recruitment and retention.

If there is no customer interest, the Department is cavalier about ownership responsibilities; if there is high customer interest, it is overprotective

Agency Chief Executive

5.8 The main thrust of the Levene/Stewart recommendations in this context was on changing the ownership of GREs, the primary focus of the Internal (now Open) Market policy. A number of options were considered, including ownership based on geographical lines, ownership by Research Councils and transfer to a single customer Department such as DTI. The Levene/Stewart conclusion was that the best option would be to transfer ownership of GREs away from customer Departments, and to incorporate them into one or more Civil Research Agencies (CRAs) owned by a central body (eg the Next Steps element of OPSS) which would have no customer role. The recommendation for non-customer ownership was made solely in relation to GREs on the grounds that (Levene/Stewart para 5.47) Research Councils "appear to have managed [the conflict between customer and supplier roles] reasonably well in the past" and that "ownership of Institutes [is] a by-product of the Councils' concern to ensure that high priority work is carried out".

Discussions with Departments and establishments

5.9 We have discussed a number of options in detail during our visits and interviews.

A CRA would be a bunfight between Departments

Senior departmental official

5.10 In relation to a CRA (or CRAs) encompassing GREs only, responses have tended to raise again a number of the concerns expressed following the original recommendation: that Departments could lose the guarantee of having scientific advice on hand to respond to emergencies; that it would cut across national boundaries; that OPSS could have the same problems as existing owners in dealing with the downturn in departmental expenditure; and that there was in any event a difficulty over determining which establishments should be included: in particular, that there were no special grounds for excluding establishments within the Research Council system.

5.11 Comments have also stressed that:

(a) customer arrangements had further developed since the writing of the Levene/Stewart report. Delegation of 'real' budgets to policy areas was a relatively new development at the time of the report; and the backlog

of existing contracts was such that customers were only beginning to exercise the flexibility available to them. This would change progressively over time, and it was not necessary to break the ownership link to empower the customer;

(b) removing ownership from Departments would clarify customer-supplier interests but would not remove all the owner constraints: for as long as ownership remained within Government there would still be tensions (we were pointed to a particular example arising from a MAFF attempt to vary the level of funding to an AFRC institute);

(c) the Defence Research Agency, which had been cited as a model, was not a direct structural comparator since it served, primarily, one Department;

(d) competition was the best rationalisation mechanism; a CRA would dilute this and reduce the customer's freedom of choice;

(e) a CRA superimposed upon existing arrangements would add an extra layer of bureaucracy.

If you only have advocacy, not ownership, it is difficult to pull things together

Senior Research Council official

5.12 Similar arguments have been put forward in respect of a larger CRA encompassing Research Council establishments (in this case an additional concern was loss of focus); and of structures involving transfers of ownership to other customer Departments (here comments have also included the potential for conflict of interests and priorities between customer and owner bodies).

The competition mechanism

5.13 As regards the comments on competition, we would agree that there is some evidence for the view that the customers are gradually taking on the flexibilities now available to them: as Figures 10 and 11 (pages 32 and 33) indicate, the percentage of establishment funding now resulting from competitive tendering is on the increase. It is worth pointing out, however, that the same trend did not always follow through in establishments' forecasts of future income: this may be due to uncertainty on the part of those making the forecasts.

5.14 We also agree that the Open Market for science and technology is an important rationalisation tool. The response to market changes will however be more coherent and result in better value for money for both customer and taxpayer if supply-side co-ordination mechanisms are in place. Without such mechanisms, there could actually be increased costs in the short term as a

result of uneven establishment utilisation rates and, potentially, ill-founded investment decisions. Competition is and will continue to be a spur to rationalisation, and a key means of encouraging economy and efficiency on the part of suppliers.

Underlying issues

It is possible to think of other forms of ownership for [the establishment] but these must enshrine the key features which allow it to respond to the needs of the Department and provide it with the capability of dealing with the wider range of policy issues

Agency Chief Executive

5.15 A number of the comments from PSREs, Departments and Research Councils echo in part the emphasis placed by the Fraser and Trosa reports on strategic direction. They also, however, reflect the fact that there are real underlying tensions between different perspectives on what constitute, in the words of paragraph 1.18 of the White Paper, the "best organisational and managerial structures for those laboratories which are likely to remain in the public sector."

5.16 Annex N lists the various perspectives in tabular form. There are conflicts, in particular:

— between the vision of a 'common pool' of establishments serving a number of customers and that of establishments tightly focused on and attuned to the needs of individual Departments;

— between the ideal of commercialism, which implies growing, dynamic businesses potentially able to move into the private sector and that of taut control over the activities of establishments to ensure maximum economy in the provision of public sector services;

— between the view of PSREs as 'contractors' only and the fact that many perform operational and/or policy work on behalf of Ministers;

— between the efficiency advantages of UK-wide structures and the need to take into account territorial interests and Ministerial responsibilities;

— between the view of Government science and technology as a continuum and the importance attached by the Research Councils to operating at arm's length from Government.

5.17 It would not be feasible to resolve these issues in a "top down" fashion. We have therefore, taken the pragmatic approach of reviewing a number of possible organisational models in terms of the various perspectives and in the light of conclusions reached in Chapter 4 on the potential for rationalising capabilities and facilities. We have also taken into

account the fact that geography—in the sense of the need to have access to particular types of environment, ecology or climate—may have an important part to play in the siting of research establishments. There are cases where a western site is more suitable than an eastern one (eg grasslands research); a northern more suitable than a southern (eg seed potatoes); or where widely separated sites are of value to cover a range of environments (eg marine fisheries). Geography may, in this sense, be a limiting factor on rationalisation; it may also be a pointer to it, in that establishments with overlapping activities *and* similar environments would be prime candidates for consolidation.

Models

5.18 The main models we have considered, the establishments they would include, and the major pros and cons are set out at Annex O. They comprise, in summary:

Option 1 A single CRA comprising all establishments (GREs and RIs) within the scrutiny;

Option 2 a single CRA comprising GREs only, or two CRAs consisting of separate physical and life sciences GREs;

Option 3 "market sector" oriented CRAs bringing together GREs and RIs which have related missions and user communities. This option focuses specifically on areas of most concentrated overlap. The main possible variants are:

- *Option 3a* two agencies covering (i) environment (ii) biotechnology, biological sciences, food and agriculture.
- *Option 3b* four agencies covering (i) marine resources and environment (ii) non-marine environment (iii) biotechnology and biological sciences (iv) food and agriculture.

There are also possible hybrids between 3(a) and 3(b) which would involve the creation of a single environment agency (marine and non-marine) plus separate food/agriculture and biotechnology/biological science agencies; or two environment agencies (marine and non-marine) and a single agency covering food/agriculture plus biotechnology/biological sciences.

Option 4 geographically-based CRAs bringing establishments in Scotland together under Scottish Office ownership, and creating a new MAFF CRA comprising existing MAFF PSREs in England and Wales, with the exception of Horticulture Research International, which would, along with ODA's Natural Resources Institute[9] be transferred to BBSRC, while the Forestry Commission's southern Forest Research Stations transferred to NERC.

[9] if not merged with a university

5.19 None of the options necessarily implies any change in customer responsibilities, though the transfer of the Scottish Agricultural Research Institutes to BBSRC inherent in Option 3 could reasonably be accompanied by transfer of the 'customer' role for basic research in this area, thus centring responsibility for basic research within the Research Council system. In general, we would envisage 'customer' funding remaining with the present customer Department. The new owner would require a transfer of gross running costs and some capital provision: the precise attribution would need to be negotiated with the present owner. In the short term, there would be a requirement for the customer to continue funding work under the new arrangements; but the commitment would need to decline over a period of, say, 5 years.

Comment and recommendations

Rationalisation followed by privatisation would produce more benefits in terms of value for money than instant privatisation of a swathe of institutes

Agency Chief Executive

5.20 It will be clear from the outline given in Annex O that all the structural solutions we postulate have both advantages and drawbacks. The centrally-owned models create maximum separation of customer from contractor; they also, however, increase the problems of strategic direction. Option 1 brings together the largest number of establishments and thus offers maximum scope for rationalisation; on the other hand, it would need to be broken down for management and rationalisation purposes into market-oriented divisions, and it leaves something of an awkward boundary between establishments included and those excluded. Option 2 brings together all establishments providing significant amounts of S&T to Government Departments, but the potential for co-ordinating activities across Research Council/departmental boundaries would need to be dealt with by other means. Option 3 and its variants raise some ownership issues but provide manageable solutions in terms of strategic direction and have high potential for rationalising capabilities and facilities across departmental/Research Council and geographical boundaries. Option 4 would address a proportion of the potential we have identified for rationalisation of capabilities and provide a means of ensuring facilities can be shared on a regional and local basis; strategic direction would also be relatively straightforward. All options could act as vehicles for enhancing the scope for privatisation in the longer term; each, however, implies reduction in closeness and control on the part of current owners, and potentially gives rise to issues of Ministerial accountability.

5.21 Our conclusion in Chapter 4 was that a high priority should be given to the development of structures and/or mechanisms to rationalise capabilities

within and across the areas of most concentrated overlap. Structurally, we would suggest that most benefit will derive from combining high potential for savings and/or flexible use of resources with relative ease of strategic direction. Our Terms of Reference invite us to offer one or more alternative models; of the options listed, those which best meet these criteria are, we conclude, Options 3(b) and (4).

5.22 **We recommend accordingly that Ministers give further consideration to two alternative models in particular:**

> ***Model 1*** **the creation of four new 'market sector' oriented organisational groupings dealing with marine resources and environment; environment (non-marine); biotechnology and biological sciences; and food and agriculture. The groupings would be parented, respectively, by Scottish Office, NERC, BBSRC and MAFF.**
>
> ***Model 2*** **the creation of geographically-based groupings in Scotland and in England and Wales by bringing more establishments in Scotland into Scottish Office ownership, creating a new MAFF agency comprising most existing MAFF PSREs in England and Wales, and transferring a small number of establishments to BBSRC and NERC.**

5.23 *Model 1* would involve:

(i) transfer to Scottish Office of NERC's Dunstaffnage Marine Laboratory, Plymouth Marine Laboratory, and Proudman Oceanographic Laboratory, NERC's research vessels service, and MAFF's Directorate of Fisheries Research: these would then be under common ownership with SOAFD's Fisheries Research Services;

(ii) transfer to NERC of the Scottish Office-sponsored Macaulay Land Use Research Institute and the Forestry Commission Forest Research Stations, to form a grouping with NERC's Institute of Terrestrial Ecology, Institute of Freshwater Ecology, Institute of Hydrology, British Geological Survey, and Institute of Virology and Environmental Microbiology[10];

(iii) transfer to BBSRC of the four remaining Scottish Agricultural Research Institutes (the Scottish Crop Research Institute, the Moredun, Hannah and Rowett Research Institutes), the MAFF-sponsored Horticulture Research International and ODA's Natural Resources Institute[11] to form a grouping with BBSRC's Institute of Arable Crops Research, Institute of Grassland and Environmental Research, Institute for Animal Health, Institute of Food Research, John Innes Centre, Silsoe Research Institute and Babraham and Roslin Institutes;

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[10] Consideration should be also be given to transferring IVEM (if not merged with a university) to BBSRC or MRC.

[11] if not merged with a university

(iv) transfer to MAFF sponsorship of SOAFD's Scottish Agricultural Science Agency, forming a grouping with the Central Veterinary Laboratory, Central Science Laboratory, National Institute of Agricultural Botany, and ADAS.

5.24 Model 2 would involve:

(i) transfer to the Scottish Office of the sites in Scotland of NERC's Institute of Terrestrial Ecology; BBSRC's Roslin Research Institute; the Forestry Commission's northern Forest Research Stations; NERC's Dunstaffnage Marine Laboratory; the Torry Research Station site of MAFF's Central Science Laboratory and the Lasswade Laboratory of MAFF's Central Veterinary Laboratory;

(ii) bringing together into a single grouping MAFF's remaining PSREs, other than Horticulture Research International. The latter would be transferred to BBSRC sponsorship along with ODA's Natural Resources Institute[12] and the Forestry Commission's southern Forest Research Stations transferred to NERC.

5.25 We see structures headed by Chief Executives as the most powerful mechanisms for achieving rationalisation and thus better value for money. We believe therefore that under either model, the groupings parented by Departments should be constituted as formal Next Steps Agencies overseen by a Chief Executive with a remit to achieve streamlining and continued responsiveness to market changes. The role of the Chief Executive in respect of the Research Council groupings would be filled by the existing Chief Executive of the Research Council concerned. The extra costs of the new Chief Executives' salaries would represent only a small proportion of the costs of the groupings, and should be offset by the savings achievable. **Under either model, we recommend that Chief Executives be given remits which ensure that rationalisation opportunities are seized between their organisations, as well as within them.**

[12] if not merged with a university

6. RATIONALISATION MECHANISMS

Background

6.1 Our Terms of Reference require us to recommend "means of implementing" rationalisation of capabilities and facilities; this encompasses both the structural options considered in Chapter 5 and other, non-structural options.

Alternatives to change of ownership

6.2 Bringing together management structures is, we are clear, the most powerful mechanism for achieving rationalisation of capabilities and facilities. The two main alternative mechanisms we have considered are:

a. the establishment of sectoral review teams, to examine the areas of concentrated overlap we identified and make recommendations to Departments/Research Councils on the streamlining to be effected. The teams would be disbanded once their reviews were completed;

b. the appointment for a fixed period (perhaps 3-5 years) of Directors of Rationalisation reporting jointly to the Departments concerned.

Privatisation is difficult and rationalisation is necessary (but also difficult)

Agency Chief Executive

6.3 Of the two approaches, we believe that the second is preferable: the review team mechanism would deal with immediate issues but the Director of Rationalisation approach would permit continuing oversight and adaptation to changing customer requirements. Because the Directors would not have executive responsibilities, they would be able only to recommend change, not to make it happen. There would, accordingly, need to be a commitment on the part of Departments/Research Councils to implementing the findings of the appointees, and a willingness on behalf of current establishment Directors to work with them. Their authority, in this context, might be enhanced if they had a functional reporting line to the Chief Scientific Adviser.

6.4 We would see the need for at least two Directors of Rationalisation, liaising closely with one another, and between them covering the areas of

concentrated overlap identified in Annex K. One option would be to have a Director covering environment (areas 1 and 2 of Annex K) and another covering food, agriculture, biotechnology and biological sciences (areas 3 and 4). An alternative would be to work within the broad framework of the current arrangements for the Director General of Research Councils (DGRC) to take an overview of Research Council activities and to appoint one Director of Rationalisation to review GREs and another (reporting partly to the DGRC) to consider Research Institutes.

6.5 **If, therefore, the structural approach is not adopted, we would recommend the creation of two Directors of Rationalisation posts with post-holders jointly appointed by appropriate combinations of interested Departments (OST, MAFF, SOAFD, the Forestry Commission and ODA). The Directors would be charged with identifying and recommending rationalisation of capabilities and facilities within the two broad areas of (a) marine and non-marine environment (b) food, agriculture, biotechnology and biological sciences.** As with the Chief Executives proposed in Chapter 5, the costs of the additional posts would be small in relation to the size of the groupings and should be offset by the savings achievable.

Supplementary mechanisms

Demand-side mechanisms

6.6 We concentrate below on mechanisms to facilitate supply-side rationalisation, but we also believe there must be mechanisms bringing together the 'demand-side' for individual establishments. A number of co-ordination mechanisms exist at present. Examples include:

(a) The Agricultural and Food Research Services (AFRS), the co-ordinating body within which AFRC provided the Scottish Office with scientific assessment of work done in the SARIs. AFRS was also used to take an overview of AFRC/BBSRC research in the agriculture and food area. This co-ordinating mechanism will continue under BBSRC;

(b) Co-ordination, in the shape of a Fisheries Customer Group, of the fisheries and marine environmental work carried out in the MAFF and SOAFD laboratories (relevant work in the private sector and other public sector establishments is taken into account);

(c) The Priorities Board for Food and Agriculture R&D. This provided customer co-ordination between the Agriculture Departments and AFRC; though currently in abeyance, there are plans for reconstitution;

(d) The concordats between MRC and the Health Departments and ODA.

A balance is needed between rationalisation and competition

Senior departmental official

6.7 These mechanisms are aimed primarily at co-ordination of customer priorities. From what we have seen they ensure that there is minimal duplication of activity, but they do not provide a comprehensive mechanism for long-term establishment planning. From the supplier point of view, the publicity which Departments have been encouraged to give to their research activities and strategies and the future development of Technology Foresight and the Forward Look processes should be beneficial. That said, the more competition is applied to the internal market, the more establishments are likely to be serving multiple Departments. Perversely, therefore, the more important it will be for PSREs and their owners to have a clearly co-ordinated customer view to prevent strategic decisions being taken on the basis of inadequate information. Options here include enhanced customer representation on establishment management boards; and annual joint customer/supplier strategic audits. **We recommend that OST, given their oversight of the Open Market policy, review with customer and owner Departments the scope for enhanced customer-side co-ordination consistent with continued emphasis on competition and market forces.**

Supply-side Mechanisms

6.8 Current actual or potential mechanisms for effecting "supply-side" as distinct from "demand-side" rationalisation include:

(a) Cabinet Committees: EDS, EDI and their official level equivalents;

(b) ownership (including funding) mechanisms within Departments to consider the optimum size, shape and structure of establishments under their control;

(c) HM Treasury's activity as scrutineer of departmental expenditure plans;

(d) the Prior Options/Next Steps process;

(e) OST's enhanced role since the White Paper in co-ordinating Science and Technology matters which cross departmental boundaries;

(f) informal consultations between Agency Chief Executives;

(g) collaboration/subcontracting arrangements between PSREs.

6.9 There is, we believe, scope for a number of enhancements. **We recommend:**

(a) that Agencies, in particular, should regularly produce for their owner Departments and OST 'competition assessments' on commercial lines detailing the main elements of their business, the extent to which competition exists elsewhere for particular activities, and

whether those activities are "core" for the establishment and its competitors;

(b) **that whenever plans are contemplated for major (over £2 million) investments such as new buildings, Departments should treat these as 'windows of opportunity' and make the detailed funding case against a background of the potential for site rationalisation with other PSREs, whether or not in common ownership.** We wonder for example whether CSL's new building would have been justifiable against this background; or, a few years ago, LGC's. The consideration being given to funding new facilities for CVL may provide an appropriate test case;

(c) **that the Next Steps Division of OPSS should formally include rationalisation in applying the Prior Options process to PSREs;**

(d) **that customers support and promote subcontracting by establishments and the formation of consortia to respond to particular requirements or sets of requirements.** Consortia are, we believe, particularly useful mechanisms to ensure efficient use of resources and avoid dilution of effort;

(e) **that owner Departments encourage their PSREs to come together in 'clubs' to consider matters of common interest, including possible rationalisations and sharing of facilities. Such clubs could be structured both functionally and geographically;**

(f) **that HM Treasury, OST, and owner Departments collectively review the scope for providing rationalisation incentives to PSRE Chief Executives/Directors and their staff;**

(g) **that for groups of PSREs where there is commonality of interests and/or geographical proximity, Departments should consider establishing joint resource management boards.** Examples where this concept might be appropriate are:

(i) MAFF's Central Veterinary Laboratory and BBSRC's Institute for Animal Health;

(ii) MAFF's Food Science Laboratory and BBSRC's Institute of Food Research and John Innes Centre.

Additional Points

6.10 To cater for other specific areas of overlap identified at Annex K, **we also recommend:**

(a) **that the Health Departments and MRC consider bringing together part of the MRC's Radiobiology Unit and the National Radiological Protection Board; the two establishments are geographically close and have overlapping interests;**

(b) that the case for transfer to either MRC or BBSRC of the Institute of Virology and Environmental Microbiology (if not merged with a university) be examined by the Director General of Research Councils, as there are strong links between the work of IVEM and that of BBSRC and MRC establishments;

(c) that there is potential for closer alignment between the Public Health Laboratory Service and NIBSC/NHS laboratories. This should be explored by the Department of Health in the light of the current review of the Public Health Laboratory Service;

(d) that the Police Scientific Development Branch would benefit from Agency status and its incorporation into the Forensic Science Service (FSS) should be addressed by the Home Office following completion of the current review dealing, *inter alia*, with possible merger of the Metropolitan Police Forensic Science Laboratory with either FSS or the Laboratory of the Government Chemist;

(e) that given the overlap in the fire research work of the Building Research Establishment and the Health and Safety Laboratory (as well as that undertaken by the Home Office, which falls outside our scrutiny), rationalisation of this activity should be considered by DOE, HSE and HO in the light of the conclusions of the current DTI Deregulation Unit Review into Fire Safety.

7. COMMERCIALISATION OF THE CUSTOMER-CONTRACTOR RELATIONSHIP

Background

More could be done to extend and accelerate the operation of market forces in relation to the science and technology which Government Departments commission

"Realising our potential", May 1993

7.1 We take the opportunity in this part of the report to bring together a number of issues relating to the operation of the Open Market and to a key underlying theme of our scrutiny, the "commercialisation" of the public sector customer-contractor relationship.

Customer/owner issues

7.2 A major objective of the Levene/Stewart report's recommendation to change the term 'Internal Market' to 'Open Market' was to highlight the importance of enabling private sector suppliers to compete for Government work. Some Departments use a checklist of questions to be addressed before sole sourcing of work within the public sector is contemplated; a copy of HSE's checklist is at Annex P. We find this a helpful approach. **We recommend that Departments draw up customer checklists tailored to individual circumstances to ensure that external competition is the preferred method of sourcing R&D/S&T work unless strategic or practical considerations clearly dictate otherwise.**

7.3 We have drawn attention in Chapter 2 to the fact we found few examples of Research Councils commissioning work in GREs. **We recommend that Research Councils declare themselves open to applications from all competent suppliers, including GREs, institutes of other Research Councils, independent research associations and the commercial as well as the academic private sector.**

7.4 A frequently expressed concern of both GREs and RIs was that there was still no "level playing field" between universities and PSREs, in that the former were still quoting for work for public sector customers at less than full economic costs. We note the recommendation in the Levene/Stewart report that Higher Education Institutions introduce accounting systems which

provide the basis for recovering FECs on contract research; and we understand that guidance has been issued. **We recommend that OST review with customers in two years' time the extent to which Higher Education Institutions are quoting for work on the same full economic cost basis as PSREs.**

7.5 A variety of approaches have been taken to providing "customer intelligence" for policy customers within Departments; most have emphasised separation of customers from suppliers. We see no conflict between broadening the supply base and using suppliers to assist in the intelligent customer role: partnerships between customers and suppliers have worked well in the private sector. **We recommend that Departments actively encourage staff exchanges between PSREs and headquarters, and draw directly on PSRE expertise as appropriate in the specification of requirements.**

7.6 We were struck by the applicability to PSREs of the general point made in "Competing for Quality" that:

> "private sector businesses have increasingly chosen to concentrate on their core business. They stick with what they know best. And they buy in specialist contractors to provide new ideas, more flexibility, and a higher level of expertise than could exist in a purely in-house operation".

7.7 We see, in this context, a key role for PSREs as prime contractors, subcontracting to other private and public sector organisations; we also see scope for greater PSRE-initiated collaboration. **We recommend that OST reformulate the Open Market policy explicitly to encompass, in addition to competition, the encouragement of collaboration/subcontracting by PSREs with private and public sector suppliers.**

7.8 We have noted earlier MAFF's commissioning arrangement with BBSRC and the related limitation on the extent to which funding can be varied. Limitations on these lines can have benefits, in that they meet the contractor's need for long term planning; on the other hand, they can lead to inflexibilities and potentially poor responsiveness to customer needs. **We recommend that MAFF progressively withdraw from its commitment to limit variations in its level of funding to BBSRC, replacing it within 4 years by contractual arrangements.**

R&D is a long-term business. Our needs tend to conflict with the shorter-term planning horizons of our customers

Agency senior manager

7.9 The Parliamentary Office of Science and Technology have commented, in their report on Science and Technology Agencies, that "the role of the

owner has not received the attention recommended" by the Fraser report. We have already suggested that there is a need for demand-side co-ordination to ensure that PSRE investment decisions are well-founded; in addition, PSREs have highlighted to us their concern that the day-to day preoccupations of customers may lead to short-termism in the definition of requirements and the need for capabilities. **We recommend that Departments ensure that the owner role is clearly separated from customers and properly resourced. Owner and customers should work closely together so that a long-term view is taken of departmental needs and the part to be played in meeting them by PSREs.**

Supplier issues

7.10 Commercialisation of the customer-contractor relationship implies that the supplier, as well as the customer, should operate on a business-like basis.

I was surprised on arrival to find the lack of appreciation of the difference between "price" and "cost"

Agency Chief Executive

7.11 The first essential is the adoption of good business practices to facilitate planning for future work, organising current work, optimising the use of human and capital resources, and developing the skills base of the establishment. This requires systems to provide a complete understanding of:

— why each programme is being undertaken;

— its relationship to the PSRE's role or mission, and to other current or projected programmes;

— what each programme is expected to deliver and when;

— the current and projected cost profile, including facilities costs as distinct from staff costs; and

— the resource requirements for each programme.

7.12 Most, but not all, PSREs have such systems in place; where they do, facilities costs are not always identified separately. **We recommend that all PSREs put accounting and other systems in place to enable them to allocate accurate costings to programmes and to distinguish the non-staff element so that the cost-effectiveness of particular facilities can be identified. We also recommend that capital investment decisions by PSREs should take account of the impact on costs to customers.**

In practice the only thing which constrains organisations like ours from being as efficient as the private sector is Government procedures

Agency Chief Executive

7.13 Commercialism in a rather broader sense implies "empowering" the supplier to expand the establishment's customer base and maximise commercial revenue. There are limitations on the extent to which this can be done at present, stemming partly from Government accounting conventions, partly from wider policies designed to minimise the size and cost of the public service. Other considerations may also come into play: increasing emphasis on competition may, for example, tend to restrict the free flow of information between suppliers who are potential or actual competitors.

7.14 PSREs make varying use of the flexibilities available to them at present. Some PSREs, for example, own "spin-off" companies to market products; a number engage in joint ventures; some collaborate in consortia (such as the Consortium of Agricultural Research Organisations in Scotland - CAROS) to market themselves to non-Government and European Commission customers. The extent to which opportunities are seized appears to depend very largely on the individual personalities in the senior management hierarchy, a fact which highlights the importance of commercially-aware management—and of incentives to management to become so. **We recommend that Departments/Research Councils set published targets, discussed interdepartmentally, which encourage all PSREs to use the scope available to them to increase joint ventures with industry and/or universities, and to maximise commercial revenue from technologies/products generated.**

You need to be able to gamble; you need to be able to fail

Institute Director

7.15 Given the tension between the ideal of commercialism (which ultimately implies PSREs should be growing, dynamic businesses capable of competing on equal terms with the private sector) and the importance of economy as well as efficiency and effectiveness in public sector organisations, we have considered whether we should recommend, as did the Levene/Stewart report, that HM Treasury should review the guidelines on "Selling into Wider Markets" discussed in Chapter 2. We note that it has proved practicable, within these limitations, for PSREs to achieve a modest increase in external contracts (see Figure 3 page 24), and that this

A number of us are attracted by the idea of [NHS-type] trusts or companies limited by guarantee

Agency Chief Executive

provides them with opportunities to improve efficiency and ride out short-term fluctuations in Government demand. We have also considered whether PSREs should be allowed to meet financial targets one year with another rather than being constrained by the provisions of annuality; to charge what the market will bear (including profit) rather than full economic costs; to have full control over staff recruitment; and to take their own decisions on market testing, contracting out etc, on the basis of commercial viability. We have looked, in this context, at a variety of organisational models, including non-profit distributing companies, trading funds and NHS-type trusts. **We recommend that all PSREs should at minimum have the flexibilities inherent in net running cost operation, but that those designated as privatisation candidates should be given the opportunity by owner Departments/ Research Councils to become either trading funds or companies limited by guarantee.**

The lack of a clear strategic view on future ownership of the establishment in face of stiff PES targets and competitive external markets makes all planning difficult and causes particular problems on staff issues

Agency Chief Executive

7.16 In the long term, we believe the tension is best addressed through strategic decision-making on the future of individual establishments of the type we recommend in Chapter 3, and taking account of the importance of maintaining a strong, well-regarded UK science base. PSREs which are to remain public sector organisations should have the emphasis placed on economy and limitation of non-Government activities, while PSREs designated as potential privatisation candidates would be encouraged to expand their markets and become as fully commercial as possible. Privatisation could, in this context, be seen as providing both short-term and long-term benefits, rather than (in the words of the Trosa report) as a "threat". **The corollary of our recommendation on planning for privatisation is thus that clear decisions should equally be taken on which PSREs are to remain, for the foreseeable future, in the public sector; and that the policy framework in which they operate should, like that for privatisation candidates, be tailored accordingly.**

8. IMPLEMENTATION

8.1 The next step for our report is a period of public consultation. During this period, **we recommend that a co-ordinating Action Manager be identified within the Office of Science and Technology to act as a focal point for bringing together the views expressed and the responses of Departments/Research Councils.**

8.2 If agreement is reached on our structural proposals, a reasonable period of time will be required to negotiate and effect the necessary PES transfers. **We recommend that the objective should be to have new structural arrangements in place by April 1996.**

8.3 An earlier implementation date could be envisaged if our main non-structural rationalisation option were preferred. **In that case, we recommend that Directors of Rationalisation be appointed as soon as possible, and in any event by April 1995.**

ANNEX A ESTABLISHMENTS INCLUDED IN THE SCRUTINY

LIFE SCIENCES SECTOR

MAFF

ADAS
Central Veterinary Laboratory
Central Science Laboratory
Food Science Laboratory (now part of CSL)
Torry Research Station (now part of CSL)
Directorate of Fisheries Research
Horticulture Research International
National Institute of Agricultural Botany

ODA

Natural Resources Institute

Scottish Office

Fisheries Research Services
Scottish Agricultural Science Agency
Scottish Crop Research Institute
Rowett Research Institute
Hannah Research Institute
Macaulay Land Use Research Institute
Moredun Research Institute

AFRC

Institute for Animal Health
Institute of Food Research
Institute of Grassland and Environmental Research
Institute of Arable Crops Research
Roslin Institute
Babraham Institute
Institute of Plant Science Research (now the John Innes Centre)

MRC

Radiobiology Unit
Toxicology Unit
Dunn Nutrition Unit
Virology Unit
Reproductive Biology Unit

NERC

Institute of Virology and Environmental Microbiology
Institute of Terrestrial Ecology
Institute of Freshwater Ecology
Dunstaffnage Marine Laboratory
Plymouth Marine Laboratory

DH

Public Health Laboratory Service
National Radiological Protection Board
National Institute for Biological Standards and Control

Forestry Commission

Forestry Commission Forest Research Stations

PHYSICAL SCIENCES SECTOR

DOE

Building Research Establishment

DOT

Transport Research Laboratory

Home Office

Police Scientific Development Branch
Forensic Science Service

DTI

National Engineering Laboratory
National Physical Laboratory
AEA Technology (and Warren Spring)
Laboratory of the Government Chemist
National Weights and Measures Laboratory

HSE

Research and Laboratory Services Division
(now the Health and Safety Laboratory)

AFRC

Silsoe Research Institute

NERC

Proudman Oceanographic Laboratory
Institute of Hydrology
British Geological Survey

SERC

Daresbury Laboratory } (now
Rutherford Appleton Laboratory } combined)

ANNEX B LIST OF ORGANISATIONS CONSULTED

Establishments included in the scrutiny

ADAS
AEA Technology
Babraham Institute
British Geological Survey
Building Research Establishment
Central Science Laboratory
Central Veterinary Laboratory
Directorate of Fisheries Research
Dunn Nutrition Unit
Dunstaffnage Marine Laboratory
Fisheries Research Services
Food Science Laboratory (now part of CSL)
Forensic Science Service
Forestry Commission Research Division
Hannah Research Institute
Horticulture Research International
Institute for Animal Health
Institute of Arable Crops Research
Institute of Food Research
Institute of Freshwater Ecology
Institute of Grassland and Environmental Research
Institute of Hydrology
Institute of Plant Science Research (now the John Innes Centre)
Institute of Terrestrial Ecology
Institute of Virology and Environmental Microbiology
Laboratory of the Government Chemist
Macaulay Land Use Research Institute
Moredun Research Institute
National Engineering Laboratory
National Institute of Agricultural Botany
National Institute of Biological Standards and Control
National Physical Laboratory
National Radiological Protection Board
National Weights and Measures Laboratory
Natural Resources Institute

Plymouth Marine Laboratory
Police Scientific Development Branch
Proudman Oceanographic Laboratory
Public Health Laboratory Service
Radiobiology Unit
Reproductive Biology Unit
Research and Laboratory Services Division (now the Health and Safety Laboratory)
Roslin Institute
Rowett Research Institute
Rutherford Appleton Laboratory (now combined with the Daresbury Laboratory)
Torry Research Station (now part of CSL)
Toxicology Unit
Transport Research Laboratory
Virology Unit
Scottish Agricultural Science Agency
Scottish Crop Research Institute
Silsoe Research Institute
Warren Spring Laboratory (now merged with AEA Technology)

"Owner" organisations

Agricultural and Food Research Council (now part of BBSRC)
Department of the Environment
Department of Health
Department of Trade and Industry
Department of Transport
Forestry Commission
Health and Safety Executive
Home Office
Medical Research Council
Ministry of Agriculture, Fisheries and Food
Natural Environment Research Council
Overseas Development Agency
Science and Engineering Research Council (responsibilities now redistributed)
Scottish Office Agriculture and Fisheries Department

Others

Council of Civil Service Unions
HM Treasury
Hoechst UK Ltd

HR Wallingford Ltd
KPMG Peat Marwick
Meat and Livestock Commission
PA Consulting Group
Parliamentary Office of Science and Technology
Receiver for the Metropolitan Police District
Water Research Centre

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ANNEX D DEFINITIONS

1. The internationally agreed "Frascati Manual"[1] defines **scientific and technological** activities as comprising:

> systematic activities which are closely concerned with the generation, advancement, dissemination and application of scientific and technical knowledge in all fields of science and technology.

2. These include:

> **Research and development:** creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications;
>
> **scientific and technological services:** activities concerned with research and experimental development and contributing to the generation, dissemination and application of scientific and technical knowledge (including technology transfer).

3. The abbreviations "R&D" and "S&T" are used in this report to refer to research and development and scientific and technological services respectively.

4. The Government's Annual Review of Government-funded Research and Development provides the following definition of various sub-categories of R&D activity:

> **basic research:** experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable fact, without any particular application or use in view;
>
> **applied research:** original investigation undertaken to acquire new knowledge, but directed primarily towards a specific practical aim or objective. Within this:
>
> > **applied strategic research** is defined as applied research where the work has not yet advanced to the stage where eventual applications can be clearly specified;
> >
> > **applied specific research** has quite specific and detailed products, processes, systems etc as its aims;

[1] The Management of Scientific and Technical Activities: Proposed Standard Practice for Surveys of Research and Experimental Development. "Frascati Manual" 4th edition OECD, Paris, 1981.

experimental development is systematic work drawing on existing knowledge gained from research and practical experience that is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed.

ANNEX E THE ESTABLISHMENTS: SIZE, SHAPE AND MISSION

ESTABLISH-MENT	STATUS	% R&D	SIZE (PERSONNEL)	ANNUAL COSTS 92/93 £000	MISSION	COMMENT
ADAS	MAFF AGENCY	31%	2,420	85,100	To be leading consultancy to land-based industries in UK; to provide quality services.	
AEA TECHNOLOGY	STATUTORY AUTHORITY OPERATING UNDER TRADING FUND	25%	8,042	404,900	To supply scientific and engineering services worldwide. Also has responsibilities for safe management of historic nuclear liabilities, with funding from DTI.	Figures do not include Warren Spring.
BABRAHAM INSTITUTE	BBSRC INSTITUTE	100%	313.5	9,581	Research to advance understanding of molecules, genes, and systemic processes in growth, nutrition, reproduction, lactation, health and welfare in the whole animal.	Recently separated from Roslin. Staff are BBSRC employees. Due to become an independent, grant-aided institute.
BRITISH GEOLOGICAL SURVEY	NERC INSTITUTE	100%	817	40,578	To provide geoscience information to underpin the nation's prosperity; supply relevant information, services and advice. Undertake geoscience mapping, monitoring, research and development both in GB and internationally.	
BUILDING RESEARCH ESTABLISH-MENT	DOE AGENCY	38%	740	41,575	Research related to design construction and performance of built works, prevention and control of fire, and protection of the environment; advice based on that research and knowledge.	
CENTRAL VETERINARY LABORATORY	MAFF AGENCY	65%	710	26,728	Provide specialist scientific and technical support and consultancy for animal health and welfare, food safety and the environment.	
CENTRAL SCIENCE LABORATORY	MAFF AGENCY	65%	460	16,784	To provide MAFF with efficient service of scientific support and advice to meet statutory and policy objectives.	Now incorporates (April 1994) FSL, Torry.

ESTABLISH-MENT	STATUS	% R&D	SIZE (PERSONNEL)	ANNUAL COSTS 92/93 £000	MISSION	COMMENT
DARESBURY AND RUTHERFORD APPLETON LABORA-TORIES	SERC INSTITUTE TO APRIL 94; NOW EPSRC	100%	1,919	109,846	To support and foster research work of SERC grant holders, principally by designing, constructing and operating large scale central facilities and by providing specialist scientific and technological resources.	Status due to change.
DIRECTORATE OF FISHERIES RESEARCH	PART OF MAFF	38%	445	23,110	To provide scientific information and advice on effective management and sustainable exploitation of the stocks of fish and shellfish and the protection of the marine environment around the UK.	Candidate for Agency status.
DUNN NUTRITION UNIT	MRC RESEARCH UNIT	100%	82	4,139	Research on interactions between nutrition and health with a view to influencing public health and clinical policy and practice in UK, overseas and food industry.	
DUNSTAFF-NAGE MARINE LABORATORY	NERC INSTITUTE	100%	52.5	2,078	Research into marine sciences with particular relevance to Scotland and as a component part of NERC programme.	Data include the Scottish Association of Marine Sciences, a grant-aided body (company limited by guarantee) which forms part of the Institute (and owns the site and buildings). The majority of staff are NERC employees.
FISHERIES RESEARCH SERVICES	PART OF SO AGRICUL-TURE AND FISHERIES DEPT	39%	250	15,190	Advice on marine and freshwater fisheries aquaculture, and related environment questions. National and EU legislation and regulatory duties and strategic research for other functions.	Candidate for Agency status.
FOOD SCIENCE LABORATORY	NOW PART OF CSL	34%	105.5	5,677	To provide support and advisory functions to Minister and policy divisions on food safety.	Merged with CSL as part of larger MAFF agency.
FORENSIC SCIENCE SERVICE	HOME OFFICE AGENCY	5%	625	24,508	To maximise the benefit of forensic science to the criminal justice system by providing scientific support to police forces and expert evidence to courts.	
FORESTRY COMMISSION FOREST RESEARCH STATIONS	PART OF FORESTRY COMMISSION	80%	307	10,004	To carry out cost effective, high quality research into the sustainable management and use of trees, woods and forests.	
HANNAH RESEARCH INSTITUTE	SO NDPB: COMPANY LIMITED BY GUARANTEE (CHARITABLE STATUS)	100%	135.5	4,239	To undertake fundamental, strategic and applied research relevant to the production and utilisation of milk and to lactation.	Staff are Institute employees; SO has responsibility for redundancy costs.
HEALTH AND SAFETY LABORATORY	PART OF DEPT EMPLOY-MENT NDPB (HSE)	44%	400.5	20,954	Ensure that risks to people's health and safety from work activities are properly controlled. Provide quality research and scientific support and database of information on industrial risks.	Formerly the Research and Laboratory Services Division

ESTABLISH-MENT	STATUS	% R&D	SIZE (PERSONNEL)	ANNUAL COSTS 92/93 £000	MISSION	COMMENT
HORTI-CULTURE RESEARCH INTERNAT-IONAL	MAFF NDPB: COMPANY LIMITED BY GUARANTEE	97%	716.5	22,266	To serve customers through excellence in cost-effective scientific research and development in horticulture.	
INSTITUTE FOR ANIMAL HEALTH	BBSRC GRANT AIDED INSTITUTE: COMPANY LIMITED BY GUARANTEE (CHARITABLE STATUS)	93%	536	16,566	A national centre of excellence for fundamental and strategic research on the application of molecular, cellular and epidemiological science to diseases of animals, including man.	Staff are BBSRC employees.
INSTITUTE OF ARABLE CROP RESEARCH	BBSRC GRANT-AIDED INSTITUTE: COMPANY LIMITED BY GUARANTEE (CHARITABLE STATUS)	100%	773	19,844	To improve understanding of processes in crop growth. Increase efficiency and competitiveness of crop production in UK and enhance quality and marketability of arable commodities through agricultural practices sympathetic to the environment.	Two thirds of staff are BBSRC employees. One third are university employees.
INSTITUTE OF FOOD RESEARCH	BBSRC INSTITUTE	100%	489	15,738	Long term, interdisciplinary, strategic, generic, scientific research relevant to food and allied biologically-based industries.	Staff are BBSRC employees. Due to become independent, grant-aided institute.
INSTITUTE OF FRESHWATER ECOLOGY	NERC INSTITUTE	100%	105	4,436	Research in the area of science of fresh and estuarine waters; studies of the interactions between terrestrial and freshwater ecosystems. Development of sustainable management and conservation.	Data include the Freshwater Biological Association, a grant-aided body, (company-limited by guarantee) which forms part of the institute (and owns all the buildings). All staff are NERC staff, except the Director FBA.
INSTITUTE OF GRASSLAND AND ENVIRON-MENTAL RESEARCH	BBSRC GRANT-AIDED INSTITUTE: COMPANY LIMITED BY GUARANTEE (CHARITABLE STATUS)	100%	395	12,056	To improve the efficiency and sustainability of agriculture by conducting basic and strategic research on plants, animals and micro-organisms relevant to grasslands and ruminant animal production.	Staff are BBSRC employees.
INSTITUTE OF HYDROLOGY	NERC INSTITUTE	86%	214	7,800	To advance science of hydrology through research and investigate changes; to provide data and advice to HMG; to promote use of data to enhance UK industrial competitiveness and quality of life.	
INSTITUTE OF TERRESTRIAL ECOLOGY	NERC INSTITUTE	100%	270	15,000	To develop research and exploit new technologies in order to understand the science of the natural environment, particularly terrestrial eco-systems, and disseminate knowledge to decision makers.	
INSTITUTE OF VIROLOGY	MRC RESEARCH UNIT	100%	64	2,159	Research on structure, function, and information content of viruses, with a view to understanding pathogenesis and the development of therapies and vaccines.	

ESTABLISH-MENT	STATUS	% R&D	SIZE (PERSONNEL)	ANNUAL COSTS 92/93 £000	MISSION	COMMENT
INSTITUTE OF VIROLOGY AND ENVIRON-MENTAL MICRO-BIOLOGY	NERC INSTITUTE	100%	67	2,823	Study viruses and microbes, their relationships with vertebrates, invertebrates and plants and their roles in the natural environment.	
JOHN INNES CENTRE	BBSRC SUPPORTED INSTITUTE (3 ELEMENTS EACH WITH DIFFERENT STATUS)	100%	426	13,831	Multi-disciplinary research on plants and micro-organisms; to train scientists and disseminate results of research to increase scientific knowledge and benefit agriculture, horticulture, food and pharmaceutical industries and biotechnology.	Formerly the IPSR. Reconstituted as John Innes Centre from April 1994. Most staff are JIC employees.
LABORATORY OF GOVERN-MENT CHEMIST	DTI AGENCY	37%	322	15,706	To be a leading chemical science laboratory in Europe, fostering quality in analytical and molecular biological measurement, and providing competitive and trusted services, meeting customer requirements and statutory responsibilities.	
MACAULAY LAND USE RESEARCH INSTITUTE	SO NDPB: COMPANY LIMITED BY GUARANTEE (CHARITABLE STATUS)	96%	276	9,049	Research in context of rural land use and resource management. Assessment of environmental economic and social impacts of agriculture and related land uses, and consequences of changes.	Staff are Institute employees; SO has responsibility for redundancy costs.
MOREDUN RESEARCH INSTITUTE	SO NDBP: FRIENDLY SOCIETY	95%	202	4,709	High quality basic and strategic research contributing new knowledge on infectious and parasitic diseases of farm livestock and promote commercial development and application of research output.	Became company limited by guarantee with charitable status as from 1/4/94. Staff are Institute employees.
NATIONAL ENGINEER-ING LABORATORY	DTI AGENCY	31%	363.5	23,396	To provide engineering technology services to Government and industry on a commercially viable basis.	
NATIONAL INSTITUTE OF AGRI-CULTURAL BIOLOGY	MAFF NDPB (UNDER DISCUSSION)	7%	308	7,453	To offer a full range of crop variety and seed services, including plant variety registration, performance trials, seed certification and research.	
NATIONAL INSTITUTE OF BIOLOGICAL STANDARDS AND CONTROL	DH NDPB	33%	286	10,574	To safeguard and enhance public health through the standardisation and control of biological substances used in medicine.	

ESTABLISH-MENT	STATUS	% R&D	SIZE (PERSONNEL)	ANNUAL COSTS 92/93 £000	MISSION	COMMENT
NATIONAL PHYSICAL LABORATORY	DTI AGENCY	86%	775	47,178	To develop and disseminate national measurement standards, to meet Government requirements for expertise in materials testing and characterisation and IT. To ensure a consistent and recognised basis for UK measurement.	
NATIONAL RADIO-LOGICAL PROTECTION BOARD	DH NDPB	33%	358	11,425	To conduct research on radiation protection and advise HMG and others on such matters. It is also empowered to provide radiation protection services and charge for them.	
NATIONAL WEIGHTS AND MEASURES LABORATORY	DTI AGENCY	0%	48	2,205	Regulation of weighing and measuring equipment in use for trade or covered by EU directives.	
NATURAL RESOURCES INSTITUTE	ODA AGENCY	61%	544	31,978	To support the UK aid programme by helping developing countries to improve productivity and sustainable management of their renewable resources, through the application of science and technology.	
PLYMOUTH MARINE LABORATORY	NERC INSTITUTE	100%	175	10,478	Strategic research in marine sciences and support for sound environmental management and enhancement of quality of life, emphasis on interfaces between marine chemistry, biology and physics.	Data include Marine Biological Association, a grant-aided body, (company limited by guarantee) which forms part of the laboratory. All staff are NERC staff with the exception of the director MBA.
POLICE SCIENTIFIC DEVELOP-MENT BRANCH	PART OF HO	41%	99	7,399	Provision of technical advice to policy divisions, Ministers and the police service. Improvement of effectiveness and efficiency of police and prison services, HM Customs & Excise etc.	
PROUDMAN OCEANO-GRAPHIC LABORATORY	NERC INSTITUTE	100%	97	6,096	To advance understanding of processes active in seas and oceans by observation/ analysis, to synthesise these into models and transfer them to appropriate agencies. Serves UK marine scientific research community with particular focus on NERC.	
PUBLIC HEALTH LABORATORY SERVICE	DH NDPB	5%	3,397	94,344	To improve health of the population through the diagnosis, prevention and control of infectious and communicable diseases in England and Wales.	

ESTABLISH-MENT	STATUS	% R&D	SIZE (PERSONNEL)	ANNUAL COSTS 92/93 £000	MISSION	COMMENT
RADIO-BIOLOGY UNIT	MRC RESEARCH UNIT	100%	173	4,313	Research on mechanisms of action of ionising radiations on living cells and tissues and their implications for human health. The Unit has a strong basis in genetics and provides an international resource in mouse genetics. Work of the unit is also closely involved in developing anticancer drugs.	
REPRODUC-TIVE BIOLOGY UNIT	MRC RESEARCH UNIT	100%	81	2,114	Study basic mechanisms of human reproduction in search of alternative approaches to: (1) contraception; (2) management of associated aspects of reproductive health.	
ROSLIN INSTITUTE	BBSRC INSTITUTE	100%	214.5	7,357	To integrate research from molecular genetic to developmental biology and apply this to animal breeding, animal welfare and poultry science.	Recently separated from Babraham. Staff are BBSRC employees. Due to become an independent, grant-aided institute.
ROWETT RESEARCH INSTITUTE	SO NDPB: COMPANY LIMITED BY GUARANTEE (CHARITABLE STATUS)	100%	288	8,791	To advance understanding of biochemical and physiological aspects of mammalian nutrition and growth and interaction with reproduction; to investigate aspects of human nutrition.	Staff are Institute employees; SO has responsibility for redundancy costs.
SCOTTISH AGRICUL-TURAL SCIENCE AGENCY	SO AGENCY	13%	159	4,915	To fulfil Secretary of State for Scotland's obligations regarding UK and EU legislation in relation to crops and aspects of the environment.	
SCOTTISH CROP RESEARCH INSTITUTE	SO NDPB: COMPANY LIMITED BY GUARANTEE (CHARITABLE STATUS)	100%	380	9,133	To conduct multidisciplinary research to advance knowledge of plant biology and improve agricultural sustainability.	Staff are Institute employees; SO has responsibility for redundancy costs.
SILSOE RESEARCH INSTITUTE	BBSRC INSTITUTE COMPANY LIMITED BY GUARANTEE (CHARITABLE STATUS)	96%	290	7,942	Research to provide understanding and innovation to benefit biology-based production/ processing industries and public interest.	
TORRY RESEARCH STATION	(NOW PART OF CSL)	66%	99	4,209	Provide research and surveillance to support policy on safety and quality of food, scientific and technical advice and laboratory support in the event of food incidents/ emergencies and scientific/ technology services to external customers.	Merged with CSL as part of larger MAFF Agency.
TOXICOLOGY UNIT	MRC RESEARCH UNIT	100%	82	3,462	Develop new concepts in mechanisms of toxicity which affect human health; investigate action of specific compounds.	
TRANSPORT RESEARCH LABORATORY	DOT AGENCY	97%	520	39,711	To provide advice, research, research management and consultancy services in the roads and transport field and areas allied to these.	
TOTALS			31341	1,351,447		

ANNEX F A BRIEF HISTORY OF THE PSREs IN THE SCRUTINY

Physical Sciences and Engineering

1. The history of the Government Research Establishments (GREs) covered by this scrutiny starts in 1842 when the Excise Laboratory, now the Laboratory of the Government Chemist (LGC), was set up in Old Broad Street in the city of London by the Board of Excise to detect adulteration of tobacco. The title Government Chemist dates from 1911 when the Department of the Government Chemist was formed to promote centralisation of Government chemical work. The current purpose of LGC, under the ownership of DTI, is to provide expertise in analytical chemistry and biological measurement to Government and other customers. Of the other laboratories currently parented by DTI, the National Engineering Laboratory (NEL), the National Physical Laboratory (NPL), AEA Technology and the National Weights and Measures Laboratory (NWML), NWML was set up in 1860 by the Board of Trade to be the national centre for what is now called Legal Metrology. NPL was set up by HM Treasury in 1900, with assistance and support from the Royal Society. It was given the role of standardising instruments and determining physical constants. It has had two other owners, the Department of Scientific and Industrial Research (DSIR) and the Ministry of Technology, before transfer to DTI. Over the last twenty years it has reduced in size from 1800 to 800 people. NEL, formed in 1947 as an offshoot of NPL to conduct engineering research, was owned initially by DSIR. It has also been reduced in size, from 900 staff in 1968 to below 370 in 1993.

2. The UK Atomic Energy Authority (now AEA) was set up by the Atomic Energy Act 1954. Initially it was responsible solely for nuclear R&D (civil and military), but the Science and Technology Act 1965 (and subsequent other Acts) extended its functions and allowed it to carry out non-nuclear R&D. Military work was transferred to the MOD in 1973. At its peak in 1965 AEA had 40,000 staff, but privatisation of parts of its operation and a reduction in the need for nuclear R&D have reduced its numbers to 8,000 in 1994. On 1 April 1994 it split into two divisions, a Commercial division known as AEA Technology and a Government division which is responsible for AEA's historic nuclear liabilities. The Government has announced its intention to privatise the business activities of AEA Technology. In 1994 DTI's Warren Spring Laboratory, which specialised in environmental science, was

transferred from its Stevenage site to join AEA and form the National Environmental Technology Centre.

3. The Building Research Establishment (BRE), now an executive agency of DOE, was founded in 1921 as the Building Research Station, which merged with the Forest Products Research Laboratory and the Fire Research Station in 1972. BRE's present purpose is to provide Government with advice on building construction and to underpin the development of building regulations. The Transport Research Laboratory (TRL), now owned by DOT, started life in 1933 as the Road Research Laboratory to carry out research into materials and methods of road construction. It was reconstituted as the Transport and Road Research Laboratory by DSIR in 1972, with a widened remit. TRL was launched as an Executive Agency in April 1992.

4. The Health and Safety Laboratory has evolved from the Safety in Mines Research Establishment formed in 1911 as a Home Office experimental station at Eskmeals on the Cumberland coast. Its role was to undertake research to improve the safety of British coal mines. In 1926 a new field station was opened in Buxton dealing with explosions and fires and in 1928 engineering safety laboratories were opened in Sheffield. The demand for occupational hygiene laboratory services arose from the work of the Factories Inspectorate and led to the formation of an Industrial Hygiene Division in 1966 at Baynards House in London, later moved to Cricklewood in North London. The various components were brought together in 1975 to form the Research and Laboratory Services Division of HSE (RLSD). Restructuring shortly afterwards led to the creation of three distinct laboratories within RLSD; the Explosion and Flame Laboratory at Buxton in Derbyshire; the Safety Engineering Laboratory mainly in Sheffield and the Occupational Medicine and Hygiene Laboratory, initially split between Sheffield and Cricklewood but now combined on one site in Sheffield. RLSD became the Health and Safety Laboratory in April 1994.

5. The Rutherford and Daresbury Laboratories began life in 1957 and 1962 respectively as establishments of the National Institute for Nuclear Science, with a mission to provide, for common use by universities and others, facilities and equipment which are beyond the scope of individual universities and institutions carrying out research in the nuclear field. The Science Research Council (SRC, later SERC) was set up in 1965 and took over the management of the two laboratories. Within SRC, Rutherford and Daresbury remained single-purpose establishments providing the UK's principal means of pursuing academic (non-defence related) work in nuclear science until the mid-1970s. Thereafter, because of the increasing scale of nuclear and particle physics experiments, international collaborations became the main avenue for this work. Since the 1970s the resources of the two laboratories have been progressively redeployed away from nuclear science to other areas of science and engineering. The Appleton Laboratory,

formerly the Radio Research Station, was founded in 1921, and became part of the SRC in 1965, merging with the Rutherford Laboratory in 1979. Its mission grew from the study of radio and radar to embrace more general atmospheric studies and astronomy.

6. The Daresbury and Rutherford Appleton Laboratories now provide large scale facilities and programme coordination across the range of science and engineering covered by the Research Councils. In April 1994 the laboratories were merged under a single Director, with an integrated administration, and are currently managed within the Engineering and Physical Sciences Research Council. There are plans to give the combined laboratory new status independent of any individual Research Council.

Human Health

7. The National Institute of Biological Standards and Control has its origins in the 1925 Therapeutic Substances Act. The present institute was formed in 1972 from two divisions of MRC's National Institute of Medical Research. In 1975 the National Biological Standards Act established a Standards Board which took over responsibility for NIBSC. The unit moved in 1987 from its original base in Hampstead to a location in South Mimms.

8. The MRC Dunn Nutrition Unit, located at present on three sites in Cambridge but with plans to centralise on one site at Addenbrookes Hospital, was established in 1928 to research fundamental metabolic relationships and the role of micronutrients in human and clinical nutrition across the socio-economic spectrum, including third world nutrition problems. Its remit now includes the diseases of affluence such as cardiovascular disease and cancer.

9. A number of new health institutes were formed in the immediate post war period. The MRC Toxicology Unit and the Radiobiology Unit were both formed in 1947. The Toxicology Unit was an offshoot of what is now the Chemical and Biological Defence Establishment. It moved from Carshalton to Leicester in 1993 and is now located next to the Leicester Medical School.

10. The MRC Radiobiology Unit, located close to AEA Harwell, was established to investigate the toxic effects of radiation and to develop methods for protecting people against them. It carried out pioneering work which led to medical treatments such as bone marrow transplants. In recent years the programme has broadened to include research aimed at ways of using radiation in the treatment of human diseases. The National Radiological Protection Board, also based near AEA at Chilton with sites in Glasgow and Leeds, has its origins in the mid 1950s. Initially formed as a division of the AEA, it was fused in the late 1960s with the MRC's Radiological Protection Service and was constituted in its present form by the Radiological Protection Act 1970. Its role is to carry out research and monitoring to protect people from radiation.

11. The Public Health Laboratory Service (PHLS) with headquarters at Colindale, North London was also formed on a permanent footing after the war in 1945, although its origins date back to 1938 when the Emergency Public Health Service Laboratory was established by the Ministry of Health (through the MRC). PHLS was incorporated as a statutory body under the 1977 National Health Service Act and is made up of the Central Public Health Laboratory and the Communicable Disease Surveillance Centre, both situated at Colindale, together with 52 laboratories in hospitals throughout England and Wales. The number of laboratories associated with PHLS has fluctuated over its history and there are plans for further rationalisation. Its mission is concerned with the diagnosis, surveillance, investigation and control of infection and communicable diseases in England and Wales.

12. The MRC Virology Unit, together with the Glasgow University Department of Virology, forms part of the Institute of Virology, established in 1957. The Honorary Director of the Unit also holds the appointment of Professor of Virology at the University, and there is a high degree of integration between the Unit and the University. The Unit carries out research on the structure, function and information content of viruses with particular reference to changes in infected animal cells.

13. The most recently formed health establishment in the scrutiny is the MRC's Reproductive Biology Unit which was established in 1972 and is closely integrated with Edinburgh University and the Royal Infirmary as a part of the Edinburgh Centre for Reproductive Biology. The Centre carries out studies into reproduction to find new mechanisms to control human fertility.

Forensic Science

14. Forensic science started in the UK in 1871 when army experts were called on to help the Home Office to investigate explosions. It was not until the Metropolitan Police Laboratory was set up to serve the Metropolitan Police Force in 1935 that forensic science formally became part of police investigations. The Home Office Forensic Science Service was set up in 1966 as an amalgam of other police laboratories (most established in the 1930s) serving provincial police forces of England and Wales. At the same time the Forensic Science Central Research Establishment was set up at Aldermaston, later to move to Birmingham. In 1989 a number of changes to the organisation of the FSS were recommended by the Home Affairs Select Committee. These were accepted by the Government. The FSS moved to Agency status in 1991 and has introduced charges for its services to police forces, who are its main customers.

15. The original Police Scientific Development Branch was set up following a Royal Commission in the late 1960s. During the 1980s it was amalgamated with the HO Scientific Advisory Branch to form the Scientific Research and Development Branch. This was reorganised in 1990 and two of the SRDB

sites at Sandridge and Langhurst were joined together and renamed PSDB. PSDB provides technical advice to the HO and police forces and carries out research and development to improve the effectiveness of the police and security forces, and Customs and Excise.

Food and Agriculture

16. There are some twenty laboratories dealing broadly with food and agriculture: three MAFF Agencies, (ADAS, the Central Veterinary Laboratory (CVL), the Central Science Laboratory (CSL)); one Scottish Office Agency (the Scottish Agricultural Science Agency); eight AFRC (BBSRC) institutes; five Scottish Agricultural Research Institutes (SARIs); two MAFF-sponsored NDPBs (Horticulture Research International, the National Institute of Agricultural Botany); and the Natural Resources Institute of the Overseas Development Administration.

17. The oldest of the MAFF agricultural laboratories is CVL which began its service of providing diagnostic support for animal diseases in 1894 as a veterinary laboratory in rooms adapted for the purpose in Whitehall Place. It moved to its present main site at Weybridge in 1917. CVL also has a laboratory in Scotland at Lasswade.

18. CSL was established in 1988 from the ADAS laboratories at four major sites (Harpenden, Slough, Tolworth and Worplesdon) and a number of smaller units. The laboratory at Harpenden dates back to 1916, and the recognition of the need to protect plants from pests and diseases. The laboratory at Slough, situated on the site of an Imperial College Field Station, was established in 1927; with the outbreak of war in 1939 it was transferred to DSIR because of its expertise in food storage. After a period as an ARC laboratory it was transferred to MAFF in 1970. The laboratory at Tolworth dated from the late 1940s and was formed to research control of vertebrate pests which damaged crops. Part of the laboratory moved from Tolworth to Worplesdon in 1959, and the Tolworth site was closed in 1990. MAFF's Food Science Laboratory at Norwich and Torry Research Station near Aberdeen were merged with CSL on 1 April 1994 and parts of the enlarged CSL will be moving to a new site in York by 1996.

19. ADAS, jointly owned by MAFF and the Welsh Office, has its origins in the post-world-war need to assist the agricultural industry to improve its production of food. Following the Agriculture Act of 1944 several organisations were set up to achieve this, notably the National Agricultural Advisory Service, the Land Service and the Drainage Service. In 1971 these bodies were amalgamated into ADAS which was tasked with providing consultancy and research services to agriculture and other land-based industries, paid for by Government, and advice, S&T services and R&D to Government. In 1984 MAFF initiated a review of these arrangements and the 1986 Agriculture Act made provision for ADAS to charge for its services.

ADAS was transformed into an Agency in 1992 and as a result has undergone considerable rationalisation with, a reduction from 90 to 65 in the number of sites, and a substantial decline in staff numbers.

20. During the 1914-18 war the importance of developing new varieties of crops to increase production was recognised and the National Institute of Agricultural Botany was founded in Cambridge for this purpose in 1919. The funds for its establishment were provided by agricultural merchants, millers and other agricultural traders and by the Ministry of Agriculture. The institute now offers a full range of crop variety and seed services, including plant variety registration, variety performance trials, seed testing and certification and research in a wide range of disciplines. Like many organisations in the plant science sector, NIAB has also declined in size, from 340 staff in 1990 to to 275 in early 1994 with further reductions in prospect.

21. Of the BBSRC institutes, the oldest is the Institute of Arable Crops Research (IACR) based at Rothamsted. The first experiments in the fields of Rothamsted Manor were carried out by John Bennet Lawes in the 1830s and the Rothamsted Experimental Station was formally established in 1843. In 1889 Lawes established the Lawes Agricultural Trust with some of the proceeds from the sales from his fertiliser business. The money from the trust is still used to enhance the Rothamsted site. The other site which is now part of IACR, the Long Ashton Research Station, was the second oldest of the agricultural institutes, started in 1903 as the National Fruit and Cider Institute. The initiator of the institute, Robert Granville, had been experimenting in ways of making cider in his farm near Glastonbury since 1893 and obtained local council support for an institute to study the problems of cider making. The institute now has a more general role in crop research. Since 1981 the number of scientific staff working in the area of arable crop research has declined substantially from 835 to about 360 in 1993.

22. The third oldest BBSRC institute is the John Innes Centre at Norwich, until April 1994 the Institute of Plant Science Research (IPSR). The original John Innes Institute was founded in 1910 under the will of John Innes of Merton in Surrey. The institute moved to Bayfordbury in Hertfordshire in 1946 and again in 1967 to its present site in Norwich, where it has a close association with the University of East Anglia. In 1994 the three separate components of IPSR, the John Innes Institute, the Cambridge Laboratory (owned by Plant Science Research Ltd) and the BBSRC Nitrogen Fixation Laboratory, located at the University of Sussex, merged to form the John Innes Centre—a private company limited by guarantee and a registered charity. The Nitrogen Fixation Laboratory will move to the Norwich site in 1995.

23. BBSRC's Institute of Food Research was founded in 1985 by the bringing together of three previously separate institutes concerned with aspects of food research. The institute is currently located on two sites, adjacent to the universities of Reading and Norwich.

24. The most recently formed of the BBSRC institutes, the Institute of Grassland and Environmental Research (IGER) was formed in 1990 from the restructuring of the Institute of Grassland and Animal Production (IGAP). IGAP had been formed in 1987 when the Welsh Plant Breeding Station at Aberystwyth, the Grassland Research Institute (GRI) based at Hurley, together with elements of the Poultry Research Centre at Roslin, Edinburgh and the National Institute of Research in Dairying at Shinfield (now closed) combined into one institute. The Welsh Plant Breeding Station had been established in 1919 as a research department of the University College of Wales in Aberystwyth. Its mission was to realise the potential of grasslands for livestock production by breeding better grasses and clovers. In 1983 the station set up the Bronydd Mawr Research Centre for upland research. GRI had originally been established by MAFF in 1949 to explore the potential for greater production from grasslands. In 1958 the AFRC took over the ownership of the institute and in 1981 they also took over the North Wyke farm in Devon. During the restructuring of the institute in 1990-1992 the Hurley site was closed and the staff moved to Aberystwyth and North Wyke.

25. Horticulture Research International (HORI) had its origins in three independent institutes. The first to be formed in 1913, at the initiative of the local fruit growers in Kent, was the Horticultural Research Station at East Malling in connection with the Agricultural College at Wye. The station became independent of the college in 1920 and was known as the East Malling Research Station. In 1923 a grant made from the Development Fund led to the establishment of a second Horticulture Research Station in Cambridge, the University providing the land on one of the School of Agriculture farms. The Cambridge station was incorporated into the National Vegetable Research Station when the latter was founded in Wellesbourne in 1949. Horticulture Research International was established as a MAFF-sponsored NDPB in 1990 as a result of a merger of the AFRC Institute for Horticultural Research and the MAFF Experimental Horticulture Stations. It currently operates on seven sites, although it has plans to close the Littlehampton site. Its mission is to provide support for the UK horticulture industry and the policy requirements of Government through research in plant and microbial sciences.

26. By the late 1880s the State Veterinary Service was working to eradicate sheep pox, rinderpest and rabies. The methods used were empirical since they were devised long before the aetiology of the diseases was understood and the viral cause determined. Serious outbreaks of foot and mouth disease in England in 1922 prompted MAFF in 1924 to set up the Pirbright

Experimental Station, later called the Foot and Mouth Disease Research Institute. In 1963 the name was changed to the Animal Virus Research Institute. The present Institute for Animal Health was formed in 1986 by amalgamation of four Institutes, the Animal Virus Research Institute (Pirbright), the Houghton Poultry Research Station (Huntingdon), the Institute for Research on Animal Disease (Compton) and the Neuropathogenesis Unit (Edinburgh). They were concentrated onto two main sites—Compton and Pirbright—with the small unit in Edinburgh remaining. At the same time, the number of staff decreased from 840 to 530.

27. In 1911 the Development Commissioners identified the need for an Animal Genetics Research Unit and after the first world war the Institute of Animal Genetics was set up as part of Edinburgh University. In 1947 IAG was split into two and the Animal Breeding Research Organisation (ABRO) and a Poultry Research Centre (PRC) were formed as a result, both based on the University campus but later moved near Roslin on the outskirts of Edinburgh. Also in 1947, the ARC established the Institute of Animal Physiology at Babraham, Cambridge. In 1986 the institute at Babraham was combined with those at Roslin to form the Institute of Animal Physiology and Genetics Research. Following another review in 1992 this was divided into two Institutes, the Babraham and Roslin Institutes.

28. In striving to increase farm production in the early part of the century, the importance of mechanisation was recognised and a National Institute of Agricultural Engineering was set up in 1924 at Oxford with money from the Development Fund. The institute moved to Wrest Park, Silsoe (an English Heritage building) in 1947, and was renamed the Silsoe Research Institute in 1991.

29. The SOAFD-parented agricultural PSREs consist of the Scottish Agricultural Science Agency and the five SARIs: the Scottish Crop Research Institute, the Rowett Research Institute, the Hannah Research Institute, the Macaulay Land Use Research Institute and the Moredun Research Institute. The origin of the SARIs lies in two major legislative measures taken by the Liberal Governments of 1906-1914. The first was Lloyd George's Act of 1906 establishing the Development Fund for the purpose of stimulating the rural economy. The second was a 1911 Act on land reform which led to the establishment of the Scottish Board of Agriculture with powers to fund research and education.

30. The Rowett Research Institute is the oldest SARI, founded in 1913 by the Development Commission in collaboration with the Scottish Education Department as an institute for research in animal nutrition although in the 1920s and 1930s the main emphasis was on human nutrition. It was initially set up in Marischal College, part of Aberdeen University, and moved to its present site in 1922 helped by funds from John Rowett and others. Its present remit includes aspects of human nutrition once again.

31. The action of the Development Commission in 1912 in creating the National Institute for Research in Dairying at Reading left unmet a need for research into dairying in the wetter west coast of Britain. This led to the proposal that a Dairy Research Institute be established in Scotland and thanks to its benefactor, John Hannah of Auchincruive, the Hannah Dairy Research Institute was established in 1928 on his Auchincruive estate in Ayrshire adjacent to the West of Scotland Agricultural College. The institute has a remit to undertake fundamental and applied research into milk production and the utilisation of milk as a food.

32. Although major diseases such as rinderpest and bovine pleuropneumonia had been eradicated, other diseases such as tuberculosis, brucellosis and mastitis were still rife in the early years of this century. A group of Scottish farmers, in 1921 formed the Animal Disease Research Association (ADRA) as a registered friendly society. With support from the Development Fund, the Association built new laboratories on a site which it purchased at Moredun in Edinburgh. The research facilities there are by long-established custom known as the "Moredun Research Institute". The institute has carried out most of the research into sheep diseases in the UK, producing vaccines and sera which were sold to farmers. Until the 1950s, the institute was half-funded by ADRA from the subscription of their 5000 members, mostly in Scotland and northern England. The institute's present mission is to carry out basic and strategic research on infectious and parasitic diseases of farm livestock.

33. The Scottish Crop Research Institute (SCRI) was established in 1981 by amalgamation of the Scottish Horticulture Research Institute (which had its roots in small units such as the Strawberry Disease Investigation Unit in Auchincruive, Ayrshire and the Raspberry Disease Investigation Unit, Dundee) and the Scottish Plant Breeding Station, founded in 1921 at Craig's House in Edinburgh with equal amounts of money from the Scottish Society for Plant Breeding and the Department of Agriculture for Scotland. In 1987, in a further rationalisation, the SCRI assumed responsibility for the Scottish Agricultural Statistics Service and which provides statistical services to all the Scottish Institutes.

34. The original Macaulay Institute was set up in 1928 when Thomas Macaulay, President of the Sun Life Insurance Company of Canada, collaborated with the Department of Agriculture for Scotland to set up a Soil Research Institute because he wished to improve the agriculture on the Isle of Lewis, where his family had originated. He was persuaded to take a broader view and to found an institute for the study of soils and soil-plant interactions on the Scottish mainland. The institute, named the Macaulay Institute for Soil Research, was established in Craigiebuckler House, Aberdeen. The present Macaulay Land Use Research Institute, still based in Aberdeen, was formed

in 1987 through amalgamation of the MISR with the Hill Farming Research Organisation, based in Edinburgh, which had been established by the Department of Agriculture for Scotland in 1953 to investigate the agricultural use of hill land with a view to understanding the nutritional requirements of hill sheep, cattle and deer. The mission of MLURI is to undertake research into rural land use and resource management; it thus has a strong environmental role.

35. The Scottish Agricultural Science Agency (SASA) has its origins in the seed testing originally carried out for the Scottish Board of Agriculture by the Royal Botanic Gardens, Edinburgh. In 1913 the need for a full time seed testing station was recognised and the Scottish Seed Testing Station was set up. The increasing requirement for a Plant Registration Station to classify varieties of potatoes and oats led in 1920 to the establishment, at East Craigs, Edinburgh, of a combined seed testing and plant registration laboratory. In 1949 a unit dealing with vertebrate pests was moved to the East Craigs site. SASA is now an Agency of SOAFD. Its principal function is to provide the Department with scientific support and advice required to comply with UK and EC regulations and other policy requirements in the areas of crops, plant health, pesticides, chemical analysis and pest control.

36. The Natural Resources Institute became an executive Agency of the Overseas Development Administration in April 1990. It was previously the Overseas Development Natural Resources Institute, which was formed in 1987 by the amalgamation of the ODA's two scientific units, the Tropical Development and Research Institute and the Land Resources Development Centre. The Institute, formerly at seven separate sites, moved to its current premises at Chatham between 1988 and 1990.

Marine/freshwater and land environment

37. Establishments dealing with environmental issues include MAFF's Directorate of Fisheries Research (DFR); SOAFD's Fisheries Research Services (FRS); the Forestry Commission Forest Research Stations; and NERC's Proudman Oceanographic Laboratory, Plymouth Marine Laboratory, Dunstaffnage Marine Laboratory, Institute of Freshwater Ecology, Institute of Terrestrial Ecology, Institute of Hydrology, British Geological Survey and Institute of Virology and Environmental Microbiology.

38. NERC's Institute of Virology and Environmental Microbiology (IVEM) carries out research into viruses and microbes in the natural environment, including their relationships with animals and plants, and the identification and prevention of diseases spread by them. As such, it has health and agricultural, as well as environmental interests. It started life in the 1960s as the NERC-supported Insect Pathology Unit at Oxford University's Department of Forestry. After a number of changes of name and remit, it became part of NERC in the early 1970s.

39. Of the terrestrial environmental organisations, the oldest is the British Geological Survey (BGS) which was established in 1835 as a department of the Ordnance Survey. In 1919 it transferred to DSIR where it remained until transfer to NERC in 1965. It is based at two main sites, Keyworth near Nottingham and in Edinburgh, and at nine other smaller sites around the UK. BGS is the UK centre for earth science information and expertise and supplies geoscience mapping in UK and internationally.

40. The Institute of Terrestrial Ecology (ITE) was formed in 1973 as a research institute for the Nature Conservancy Committee (later Council). As a NERC institute it now has a wider remit and customer base. It operates on a number of sites, of which the major ones are a southern station at Monkswood and northern stations centred at the Bush in Edinburgh and at Merlwood in Cumbria. The purpose of ITE is to understand the science of the natural environment, with particular emphasis on terrestrial ecology.

41. The Forestry Commission Research Division was initiated in 1919, virtually at the same time as the Forestry Commission was established. The first research station was set up at Alice Holt in 1946 and a northern station was established in Edinburgh on the Bush Estate in 1967. Most research is designed to improve production forestry but with increasing demand for public access to forests a growing amount (currently 8%) is devoted to environmental aspects.

42. The two NERC institutes concerned with freshwater are the Institute of Freshwater Ecology (IFE) and the Institute of Hydrology (IH). IFE was formed in 1989 when NERC took over the running of the laboratories of the Freshwater Biological Association which had been established in 1929. The main IFE sites are in Windermere, Cumbria where research is concentrated on the lakes; and in Wareham, Dorset, which is the river laboratory. The institute carries out research into aspects of freshwater ecology and the dynamics of interactions between terrestrial and freshwater ecosystems. IH was formed in the 1960s to provide a UK research facility capable of collecting and interpreting hydrological data which was needed to support policy decisions concerning the impact of changing land use on the nations water supplies. In the 1970s the research was focused towards hydrological processes in floods, water resources and reservoir safety. In the 1980s and 1990s the Institute has carried out strategic research on water quality issues such as acid rain and pesticide contamination of ground waters.

43. In the area of marine science, the oldest laboratories date back to the middle and late 1800s. The Proudman Oceanographic Laboratory (POL), named after Professor Proudman who developed the theory for prediction of tides, developed from the Observatory for Sidereal Time established in 1847 in Liverpool to calibrate ships' chronometers. In 1919 this became the Liverpool Tidal Institute as part of Liverpool University. NERC took over the

Laboratory in 1969 and it took its current name in 1987. POL's role is to research marine physics, and to produce numerical models of the sea and oceans.

44. The origins of the marine fisheries and marine ecology laboratories derive partly from the two International Fisheries Exhibitions held in 1882 in Edinburgh and 1883 in London, and partly from the establishment of the Fishery Board for Scotland by Act of Parliament in 1882. The Board formed a Scientific Investigation Committee to help it make suggestions as to how Scottish fisheries could be improved. In 1885 the Board erected a laboratory at Tarbert on Loch Fyne to study the Clyde herring fishery. The Tarbert laboratory was closed in 1882 because of lack of funds. A small laboratory and hatchery were developed at Dunbar before a permanent site was established in 1898 at the Bay of Nigg, Aberdeen. The Aberdeen Marine Laboratory, now part of SOAFD's Fisheries Research Services, is still situated close to the Nigg Bay site and, together with its Freshwater Fisheries Laboratory at Pitlochry (established in 1948), is concerned with marine and freshwater fisheries, aquaculture and the marine environment.

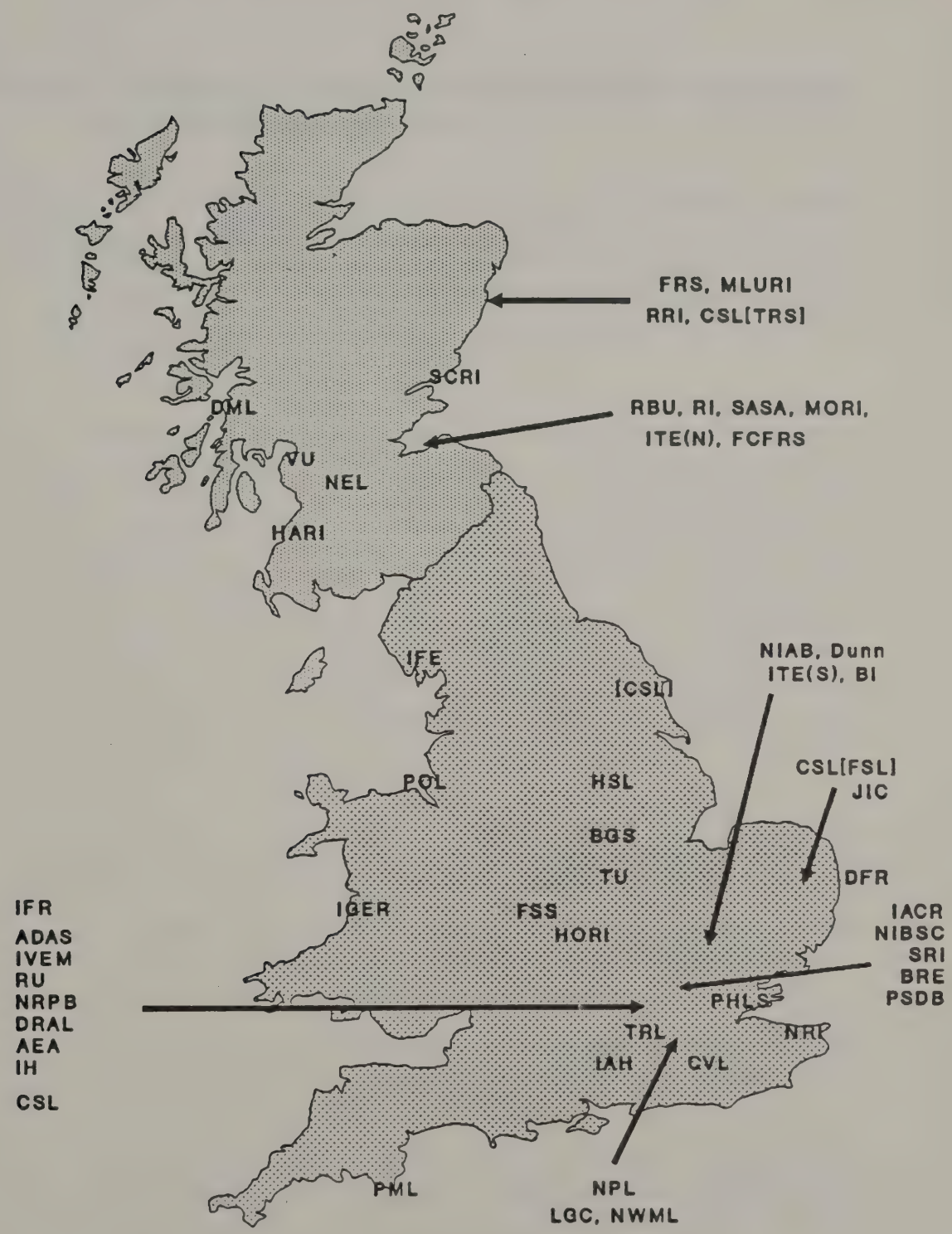
45. The origins of NERC's Dunstaffnage Marine Laboratory lie in the Edinburgh Fisheries Exhibition of 1882, a surplus of money from which was allocated to the Scottish Meteorological Society to set up a Scottish Marine Station. The station was established in 1884 on a canal barge moored at Granton in Edinburgh. The following year the barge was towed through the Forth-Clyde Canal and was beached at Millport in the Clyde, eventually being replaced by a more permanent Millport Marine Station in 1897. The name of the parent association was changed to the Scottish Marine Biological Association in 1914; in 1968 the Association moved to a new laboratory at Dunstaffnage near Oban which transferred to NERC ownership in 1989. In 1992 the name of the Association was changed to the Scottish Association of Marine Science.

46. The London Fisheries Exhibition in 1883 led to the holding of a public meeting of the Royal Society in 1884 to debate the need for a fisheries management laboratory. The outcome was the formation of the Marine Biological Association (MBA) of the UK which, in 1888, built its first laboratory on the Hoe in Plymouth. For many years the MBA in Plymouth carried out the fisheries research required for the English Fisheries Board. A Royal Commission Report of 1885 had recommended that a central authority be created to supervise the control of British fisheries. However the Lords of the Treasury, recognising that the Fishery Board for Scotland had already set up such a laboratory to advise on fisheries in Scotland, agreed that they would fund an English laboratory for a short time pending the establishment of a central facility. They also suggested that the Fishery Board for Scotland should be contracted to ensure "harmonious action" between research

activities of the two organisations. The NERC Plymouth Marine Laboratory (PML) was formed in 1988 by merger of the original MBA laboratory on the Hoe in Plymouth with the newer NERC Institute of Marine Environmental Research which had been formed in 1970. The role of the PML is to undertake strategic research on the most significant environmental questions in marine science.

47. In 1882 the English trawler owners formed the National Sea Fisheries Protection Association in Lowestoft. The Board of Agriculture and Fisheries subsequently asked the MBA to set up a laboratory in Lowestoft to research the basis for resolving international North Sea fisheries problems. That Laboratory, established in 1902, was the forerunner of the present MAFF Directorate of Fisheries Research based at Lowestoft, with other laboratories at Burnham-on-Crouch, Conwy and Weymouth.

ANNEX G LOCATIONS OF PUBLIC SECTOR RESEARCH ESTABLISHMENTS IN THE SCRUTINY



ANNEX H THE S&T ACTIVITIES OF GOVERNMENT RESEARCH ESTABLISHMENTS (GREs)

1. The S&T undertaken by GREs for and on behalf of Departments includes analysis and testing; establishing, maintaining or developing standards; monitoring and surveillance; the maintenance of databases; representation of the Department at national or international meetings; the provision of policy advice; casework, including investigation and decision-making; and the maintenance of emergency facilities.

2. The last two elements occur mainly in a regulatory context; the others can be either regulatory or "enabling" in the sense that they contribute to the competitiveness of particular UK industries. Underlying this distinction is the fact that all parent Departments have a mixture of operational and enabling responsibilities; some Departments—and hence some PSREs—are more heavily operational than others. Operational activities can raise issues of, for example, authority for decision making and speed of response which the enabling activities do not. Industry's concerns are more likely to diverge from Government's, giving rise to potential conflict of interest; and officials, on behalf of Ministers, will be taking decisions which have a direct impact on individuals' livelihoods and/or welfare. Ministers' and Parliament's interest in such decisions is likely—rightly—to be high.

3. Many GREs carry out S&T work in the name of, or in direct support of, Ministers. In this sense, it is possible to divide the activities of GREs into:

"front-line operational" —where PSRE representatives take operational decisions in the name of a Minister, or their advice on the matter is the determining factor in such decisions;

"front-line policy"—where PSRE officials act as departmental or HMG representatives on international commissions and committees, or provide policy advice direct to Ministers;

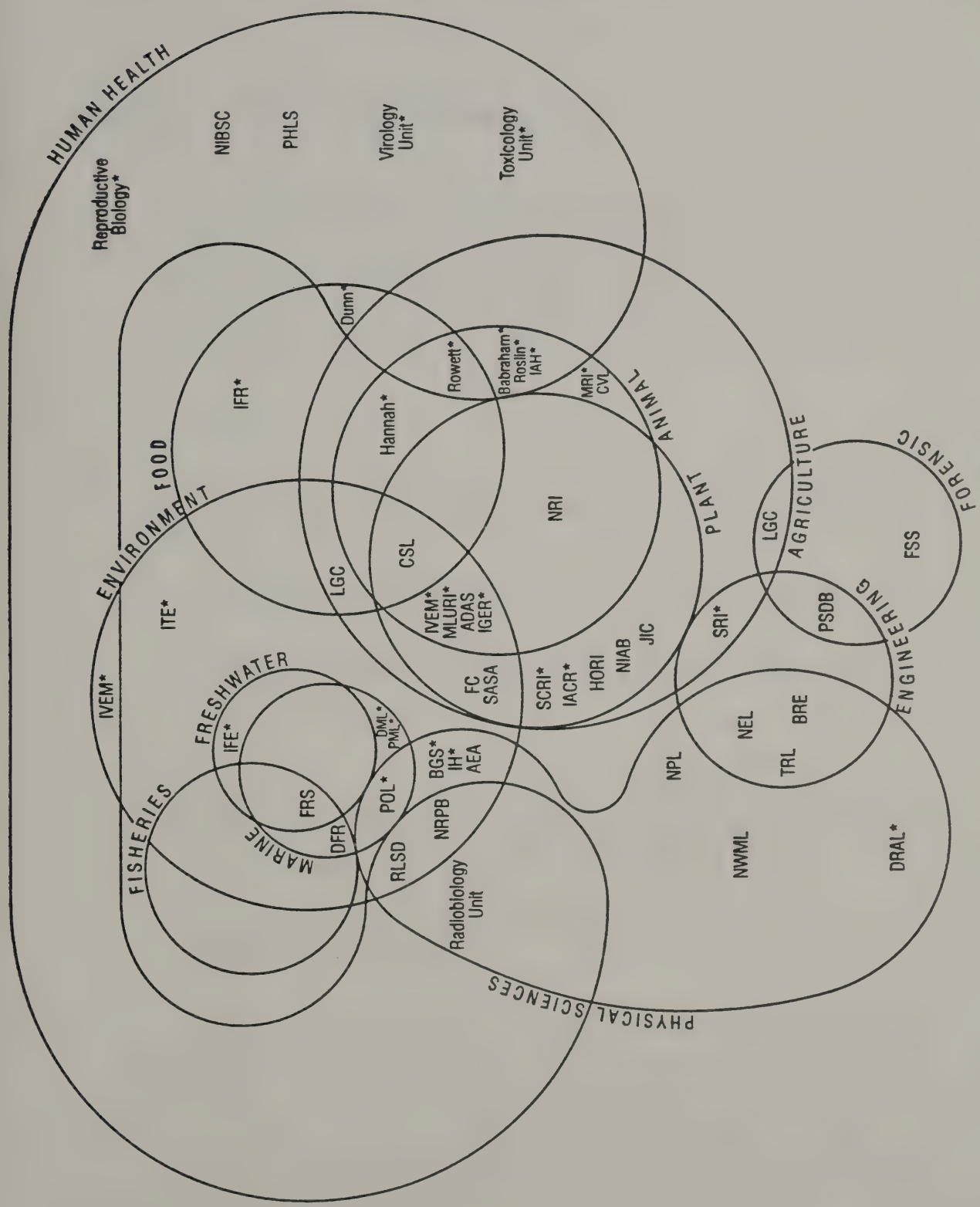
"immediate support to operations/policy" —where establishment representatives go out into the field, often at very short notice, in direct support of operations; or where they participate in negotiating teams in European and other international meetings;

"second-line support to operations/policy" —where S&T (and R&D) activities are undertaken to inform policy and assist the general conduct of operations. This can include providing support to policy departments in the "intelligent customer" role.

4. The "front-line" activities in particular are, arguably, more accurately described as 'delegate' rather than 'contractor' activities.

5. In addition to their work for Departments, GREs also, either as part of their official role or as an offshoot from it, provide consultancy, analysis etc services to bodies outside Government. Where this activity has been developed as an offshoot, the aim is to recover costs. Where it is part of the official role, the payment arrangements vary. ADAS, for example, originally provided its advisory services to farmers free of charge and has been moving towards full cost recovery (a point which it has still not reached); while the National Institute of Biological Standards and Control, on behalf of the Health Departments, provides batch testing services for biological medicines at no charge to industry.

ANNEX I ESTABLISHMENT MISSION AREAS



Notes:
* = Research Council Institute/Unit or Scottish Agricultural Research Institute.
LGC and IVEM appear twice

ANNEX J PRIVATISATION CRITERIA

1. The distinction between public and private sector hinges ultimately on the twin issues of control and liability. A number of the establishments under scrutiny, such as the Scottish Agricultural Research Institutes and the grant-aided institutes of the BBSRC, are already, in form, "private sector-style" organisations in that they are companies limited by guarantee or friendly societies. This position derives in general from their origins as individually constituted trusts.

2. However:

(a) despite the fact that SARI employees are employed by the Institutes themselves, not by SO, there is agreement that the SO bears the cost of redundancies;

(b) the staff of BBSRC's grant-aided Institutes are in general BBSRC employees,

(c) responsibility for a number of Board appointments also rests with Government.

Privatisation

3. From our discussions with interested parties and analysis of past and projected privatisations, we believe that there are three main criteria against which to measure the scope for privatisation of PSREs.

4. The first is the *extent to which the activities undertaken could be carried out within the private sector.*

5. We consider that many of the activities now undertaken by PSREs could **in principle** be undertaken within the private sector. The closer these activities are to the core activities of Departments, the more difficult this becomes: we see arguments, in particular, for 'front line' S&T activities, both operational and policy ones, being performed within the public sector. It is not always an easy matter, however, to disentangle these from the other activities, which often either underpin or complement them.

6. The second is the *extent to which the resulting private sector organisation could be permitted control of its own destiny,* including possessing the ability to stop doing work for Government and/or diversify. If Government felt the need to intervene to stop an organisation going under or changing its focus then the benefits of privatisation would be reduced. We believe that the chances of this are minimised to the extent that:

(a) alternative sources of expertise exist or could fairly readily be created[1];

(b) expansion of the establishment's customer base is unlikely to give rise to conflict of interest with work done for Government;

(c) Government's potential concern relates to the loss of a capital facility such as a test bed. It would be relatively simple to handle this either by having a long-term contract with the supplier or by retaining the facility in Government ownership and leasing it to the private sector owner of the establishment.

7. The third criterion is *how far the organisation is in shape to thrive in the private sector.* The issues raised here are most clearly seen in the context of a potential trade sale or flotation when the need would exist to attract private sector purchasers or investors; but they also apply more generally. The salient points are: a clear focus or mission; a clear revenue stream, with if possible potential for growth (the balance between public and private sector sources of income—actual and potential—would be important here as changes of Government policy can mean radical changes in funding); a competent management team; commercial-type operating methods, including accounts; and a favourable balance between assets and liabilities.

Mergers with universities

8. Different considerations arise in respect of mergers with/conversions into university departments, a form of change of status not usually defined as privatisation, but one which can fairly be described as such (HM Treasury have confirmed that they regard universities as "private sector"). The underlying rationale here would have less to do with the introduction of commercial disciplines and opportunities[2] and more to do with synergy. The main criterion in this case would be commonality of interest and expertise, though funding stream considerations would also come into play.

[1] There are drawbacks in any event to creating large private sector monopoly suppliers of services to Government which would then need regulating.
[2] Universities do however have access to some sources of charitable funding which are not open to public sector establishments.

ANNEX K DUPLICATION AND OVERLAP

1. Perhaps unsurprisingly, given the number of interdepartmental co-ordinating committees (for examples see Chapter 6), we found few instances of actual duplication in the sense of the same work being done for different customers. Where duplication appeared to exist, it was sometimes a function of services being provided on a regional basis (thus DFR and FRS provide fisheries and marine environment services around England/Wales and Scotland respectively) or it had emerged as a result of competition (eg elements of forensic analysis work being undertaken within LGC). More often than not, the duplication was at the technique or basic equipment level, reflecting the fact that the skills of the individual scientist and the equipment used are in practice 'building blocks'. It was stressed to us a number of times that establishments possessed unique combinations of capabilities, rather than capabilities which were in themselves unique.

2. Duplication of technique is probably better categorised as overlap, a term which we use to mean parallel activity on different 'targets' or for different purposes. We found multiple examples of this: indeed it was a key feature of the pattern of activity which emerged from our review. Sometimes it resulted from customer- or establishment-initiated collaboration, eg in the fields of agroforestry or pesticide analysis. More often, especially in the life sciences sector, it emanated from the fact that establishments have partially overlapping missions. We found, for example, similar work being done on different crops, such as genetic improvement, integrated pest management or effects of climate change. An indication of the extent of overlap may be seen in Annex L, which lists, for each establishment, collaborators and establishments undertaking work in similar areas.[1]

3. Science does not fall into watertight compartments, and there is no *a priori* set of boundaries or parameters which would receive universal assent as a way of categorising the overlap. Various individuals have suggested to us that there are "obvious" boundaries to be drawn round particular functional groupings; but they often differed radically in the groupings they put forward.

[1] This information was drawn primarily from establishments' responses to the team's questionnaire.

4. We have, therefore, approached the question of overlap by analysing the detailed data provided by establishments concentrating in particular on four aspects: skill base of staff, facilities, major programmes, and collaborators/ other organisations undertaking similar work.

5. Our conclusions are given below under the headings of life sciences and physical sciences, the two broad sectors into which our review was initially divided; they include, for completeness, PSREs identified as possible candidates for privatisation, including transfer to universities. In practice, as was expected when the scrutiny was established, we have not found "physical sciences" and "life sciences" to be a hard and fast distinction: some "physical sciences" establishments are, in consequence, included below under the "life sciences" heading.

Physical Sciences sector

6. Of the 16 establishments initially categorised for scrutiny purposes as "physical sciences':

(a) a number—the Transport Research Laboratory, the National Engineering Laboratory, AEA Technology (incorporating Warren Spring), and the Laboratory of the Government Chemist—are en route to privatisation. The National Physical Laboratory is also planned for operation by private sector contractors: this may in due course lead to privatisation;

(b) the Daresbury and Rutherford Appleton Laboratories have been merged during the period of our scrutiny and there are plans to give the combined laboratory new status independent of any individual Research Council.

7. The Institute of Hydrology, the British Geological Survey, the Silsoe Research Institute and the Proudman Oceanographic Laboratory are discussed under the "Life Sciences" heading below.

8. Of the remainder, we have identified overlap between BRE and NEL on engineering aspects and BRE and TRL on concrete components and structures analysis. We have already suggested earlier in this report that DOE should review the potential for privatising BRE; if, in the event, BRE remains in the public sector, then NEL and TRL should be viewed as potential private sector sources of supply.

9. There is also some read-across between specific aspects of fire research at BRE and HSL. A DTI Deregulation Unit review into Fire Safety is currently under way which may have implications for DOE and HSE, and a decision on rationalisation in this area will need to take into account the conclusions of that review.

10. Two possibilities are under detailed consideration by the Home Office in the forensic field:

(a) merger of the Metropolitan Police Forensic Science Laboratory with the Forensic Science Service;

(b) merger of the Metropolitan Police Forensic Science Laboratory with the Laboratory of the Government Chemist.

11. The Metropolitan Police Laboratory is not formally part of our scrutiny, and we have not been invited to visit it, although we have had discussions with the Receiver. From the limited evidence available to us, we believe there should be scope for savings/flexible use of manpower between the FSS and the MPFSL. We have also been given an informal estimate of the savings which might accrue from a LGC/MPFSL merger and relocation of the latter to LGC's Teddington site. As in the case of the fire regulation review above, we believe a final decision must await the detailed report to be produced shortly. If the balance of advantage lies with incorporation of the MPFSL into an enlarged Forensic Science Service then LGC should be seen as an alternative private sector supplier for forensic services.

12. We believe that Agency status would be beneficial for the Police Scientific Development Branch; and consideration should also be given to including it with FSS following completion of the review dealing with the future status of MPFSL.

Life Sciences sector

13. Within the broad "life sciences" sector, our conclusion was that there are four main areas where the overlap, and thus the potential for savings and/or flexible use of resources, is most concentrated. An outline of skills, facilities, significant programmes and collaborators/organisations undertaking similar work are given for these areas in Annex M. Within each of the areas, particular overlap is indicated by "•" in the boxes below; but the potential for savings/flexible use of manpower extends to all the establishments:

DFR	•	FRS
PML	•	DML
	POL	

Area 1: Marine Resources & Environment[2]

[2] There are also establishments outside our scrutiny whose activities overlap with those of PSREs in this area: an example is the joint NERC/Southampton University facility at Southampton.

ITE • MLURI • FCFRS

BGS • IH

IFE IVEM[3]

Area 2: Environment (non-marine)

• IGER[4] • SCRI • HORI

IACR

•

NRI • SRI

BI[5] • RI[5]

IAH • MORI

RRI[4] • HARI[4]

IFR JIC

Area 3: Biotechnology/ Biological Sciences

SASA • CSL/FSL/Torry[6]

NIAB[7] CVL

ADAS

Area 4: Food & Agriculture

[3] For additional comment on IVEM see para 15.
[4] ruminant work of IGER also has particular overlap with that of RRI and HARI
[5] these two establishments have been amalgamated and re-separated in the recent past
[6] these three establishments have been merged during the period of our scrutiny
[7] status under review

14. While the boxes represent areas of most concentrated potential they are not exclusive: scope for savings/flexibility also exists across boxes, including:

(a) between elements of the Torry Research Station (now part of MAFF's Central Science Laboratory—*area 4*) and the Aberdeen Marine Laboratory (part of the SOAFD Fisheries Research Services—*area 1*);

(b) between BBSRC's Institute of Grassland and Environmental Research (*area 1*) and establishments listed within *area 2*;

(c) between the plant health work done by MAFF's Central Science Laboratory (*area 4*) and BBSRC'S Institute of Arable Crops Research (*area 3*)[8];

(d) in the animal health sphere, between the Lasswade laboratory of MAFF's Central Veterinary Laboratory (*area 4*) and the Moredun Research Institute, a SARI (*area 3*); and potentially also between CVL and BBSRC's Institute for Animal Health (*area 3*).

15. There is also scope for savings/flexibility outside the four main areas shown. In the human health field, we saw such potential between the (small amount of) human nutrition work done by the Rowett Institute (*area 3*) and the work of the MRC's Dunn Nutrition Unit; we also noted that NERC's Institute of Virology and Environmental Microbiology (*area 2*) had much in common with MRC (and possibly BBSRC) institutes, and might be a suitable case for transfer to MRC or BBSRC if it is not to become part of the University of Oxford. Beyond this, we see potential for flexibility/savings between part of the MRC's Radiobiology Unit and the National Radiological Protection Board; and we note that the Public Health Laboratory Service network is currently under review and there may be some scope for amalgamation with NHS laboratories (outside our scrutiny) or for use of some of the facilities of the National Institute for Biological Standards and Control.

[8] If CSL's Plant Health work moves to York as currently planned, this, together with the related move of MAFF's Pesticide Safety Directorate, will create under-utilisation problems at IACR's Rothamsted site.

ANNEX L PSREs—COLLABORATING ESTABLISHMENTS AND ESTABLISHMENTS UNDERTAKING WORK IN SIMILAR AREAS

Establishment	Collaborators	Those working in similar area
ADAS	AFRC Institutes; major commercial companies; universities; HORI; CSL; CVL	Land Agents; AFRC Institutes; HORI; NIAB; private sector.
AEA Technology	British Nuclear Fuels Ltd (BNFL); Nuclear Electric; NEL; private sector.	BNFL; Government laboratories; private sector.
British Geological Survey	GREs; NERC Institutes; Overseas Development Agency; private sector	Universities; private sector.
Babraham Institute	Universities (Cambridge); MRC Units—Laboratory of Molecular Biology (LMB), National Institute for Medical Research (NIMR), RBU; EMBO (Heidelberg); INRA(Fr).	MRC Laboratories; charity-funded laboratories.
Building Research Establishment	Trade Associations (BSRIA, TRADA, CIRIA, CIBSE); Inst. Struc. Eng.; universities (London, Nottingham, Salford).	HSL; TRL; AEA Technology
Central Science Laboratory	Policy Divisions, Chief Scientist Group; ADAS; AFRC Institutes; Institutes in Denmark, Netherlands, Germany, France, Spain.	LGC; SASA; HORI; IACR; universities (Chemistry Departments, *et cetera*).
Central Veterinary Laboratory	Policy Divisions, Veterinary Investigation Service (VIS); IAH; CAMR; Universities (Surrey); Veterinary Schools (UK); Lelystad (NL); Hanover Vet. School (D); Geelong Vet. School (Aus); WS Atkins.	Veterinary Schools; Moredun; VIS; IAH; private sector.
Directorate of Fisheries Research	SOAFD Aberdeen Marine Laboratory (FRS); PML; POL; Sea Fish Industry Authority (SFIA); universities; International Convention for the Exploration of the Sea.	FRS; PML; POL; SFIA; universities.
Daresbury and Rutherford Appleton Laboratories	Universities; industrial partners (UK and European)	Overseas (some facilities); Universities; DRA Farnborough
Dunstaffnage Marine Laboratory	PML; POL; DFR; FRS; DRA; universities (UK and European).	PML; POL; DFR; FRS; universities.
Dunn Nutrition Unit	Addenbrookes Hospital; MRC—Biostatistics unit, Environmental Epidemiology Unit, LMB.	IFR; Rowett; universities; private sector.
Forestry Commission Forest Research Stations	ADAS; MLURI; ITE; National Rivers Authority (NRA).	BRE (Timber); ADAS; universities; ITE; IH; HORI; IGER.
Fisheries Research Services	Universities, Research Council laboratories; European universities.	DFR; Sea Fish Industry Authority; PML; DML; NERC laboratories; IOA-Stirling.
Food Science Laboratory (now part of CSL)	Universities; Toxicology facilities; other research establishments.	Food Research Associations; LGC; CVL; Public Analysts.

Establishment	Collaborators	Those working in similar area
Forensic Science Service	Police; Crown Prosecution Service; equipment manufacturers; universities.	Metropolitan Police Forensic Service Laboratory; LGC; DRA; Hospitals; universities; Public Analysts.
Hannah Research Institute	108 collaborators listed.	
Health and Safety Laboratory	Universities (Sheffield); TNO(NL); JRC-Ispra; National Institute of Safety and Health.	NEL; BRE; WS Atkins; LGC; former WSL; IOM.
Horticulture Research International	SCRI; JIC; IACR; ADAS; INRA(Fr); universities (Reading, Nottingham, Birmingham, Lancaster, Sheffield, Warwick, Leicester, London).	ADAS; SCRI; FCFRS; NIAB; CSL; AFRC Institutes; universities.
Institute of Arable Crops Research	ADAS; CSL; Home Grown Cereals Authority; Potato Marketing Board; Sugar Beet Research Council.	JIC; SRI; CSL; ADAS; NIAB; NRI; universities.
Institute for Animal Health	Universities (Oxford, Edinburgh, Reading, Bristol, Glasgow); private sector.	Moredun; CVL; universities.
Institute of Freshwater Ecology	ITE; IH; PML; DML; BGS; HARI; Natural History Museum	ITE; IH; FRS; DFR.
Institute of Food Research	Universities (London, Cambridge); National Consumer Council; INRA(Fr); DLO(NL).	RRI; Dunn; HARI; universities; private sector.
Institute of Grassland and Environmental Research	Universities (Wales, Plymouth, Reading, Exeter); private sector.	MLURI; ADAS; ITE; NRI; AFRC Institutes; universities; private sector.
Institute of Hydrology	ITE; IFE; BGS; POL; PML; universities (Reading, Newcastle); International Bodies.	Universities; Water Research Centre; HR (Wallingford) Ltd.
Institute of Terrestrial Ecology	IGER; MLURI; FCFRS; ADAS; Soil Survey; universities.	ADAS; AFRC Institutes; MAFF laboratories; universities; private sector.
Institute of Virology	Universities (Glasgow); Glasgow Western Infirmary; Private sector.	MRC Units; universities; private sector.
Institute of Virology and Environmental Microbiology	Universities (Oxford, Cardiff, Liverpool); overseas locations (Nicaragua).	IAH; CSL; JIC; SASA; universities (London, Leicester, Aberdeen, Cardiff, Liverpool); NIMR, NIBSC.
John Innes Centre	732 academic and 108 non-academic bodies listed.	AFRC Institutes; SCRI; Universities; private sector.
Laboratory of the Government Chemist	Centre for Applied Microbiological Research (CAMR); DTI HQ.	MPFSL; FSS; CSL; CVL; ADAS; Research Association laboratories; universities; private sector; Public Analysts.
Macaulay Land Use Research Institute	IGER; universities (Aberdeen).	ITE; Scottish Agriculture College (SAC); IH; IGER; IACR; private sector.
Moredun Research Institute	SAC; universities (Edinburgh, Bristol, Glasgow,); private sector.	Institute for Animal Health; CVL; universities.
National Institute of Agricultural Botany	MAFF HQ; SAC; IGER; ADAS; universities.	SASA; SAC; Flour, Millers and Bakers Research Association; ADAS; universities; private sector.
National Institute of Biological Standards and Control	DH; WHO; Medicines Control Agency (MCA); National Blood Transfusion Service (NBTS); Pharmacopoeia.	PHLS; MCA; NBTS.
National Engineering Laboratory	AEA Technology; RISO(DK); CETIN(Fr); PTB(D).	40 listed.

Establishment	Collaborators	Those working in similar area
National Physical Laboratory	British Institute for Physical Measurement; universities; European Institutes	European Institutes.
Natural Resources Institute	All science institutes.	[IACR, SRI].
National Radiological Protection Board	Research Council Institutes and Units; charities.	Government Departments; private sector.
National Weights and Measures Laboratory	Not submitted	
Public Health Laboratory Service	DH; CAMR; CVL; National Blood Transfusion Service; teaching hospitals.	NHS Hospitals; teaching hospitals; other GREs; Public Analysts; universities; private sector
Plymouth Marine Laboratory	POL; universities (Bristol, East Anglia, Wales, Warwick, Plymouth)	DML; POL; DFR.
Proudman Oceanographic Laboratory	PML; DFR; Institute of Oceanographic Science, Deacon Laboratory (IOSDL); universities (Southampton, Nottingham, Lancaster, North Wales).	DRA; HR (Wallingford) British Maritime Technology; PML; IOSDL; DFR; Met. Office; Hydrographic Office; Universities.
Police Scientific Development Branch	FBI (USA), DRA; Dutch Ministry of Justice.	DRA; police and security services; private sector.
Reproductive Biology Unit	Universities (Edinburgh); RI; Centre for Genome Research; World Health Organisations; Hospitals.	AFRC Institutes; SERC Units; universities.
Roslin Institute	MRC Units; Universities (Edinburgh, Glasgow, Manchester); SAC; INRA(Fr); DLO(NL); private sector.	RRI; HARI; BI; universities (Nottingham).
Rowett Research Institute	MLURI; SAC; HARI; TRS (now part of CSL); universities (Aberdeen).	SAC; IFR; Dunn; BI.
Radiobiology Unit	Clinical Research Centre (CRC); NIMR; Human Genetics Unit; universities; private sector.	CRC; Imperial Cancer Research Fund; Leukaemia Research Fund; NIMR; universities; private sector.
Scottish Agricultural Science Agency	SCRI; SAC; IACR; IFR; NIAB; CSL.	NIAB; CSL; LGC; Public Analysts; private sector.
Scottish Crop Research Institute	SARIs; AFRC Institutes; INRA(Fr);	IACR, HORI, JIC.
Silsoe Research Institute	HORI; ADAS; NRI; SCRI; AFRC Institutes; DLO-IMAG(NL); CEMAGREF(Fr).	
Transport Research Laboratory	Universities; European National Laboratories.	MIRA; universities; private sector.
Torry Research Station (now part of CSL)	FSL (now part of CSL); RRI; DFR; IFR; FRS.	LGC; FSL; CSL; CVL; RRI; AFRC Institutes; private sector.
Toxicology Unit	Institute of Environmental Health	

ANNEX M AREAS OF CONCENTRATED OVERLAP: SKILL BASE, FACILITIES, COLLABORATION AND PROGRAMMES

MARINE RESOURCES AND ENVIRONMENT

DFR, FRS, PML, POL, DML

Skill Base	Facilities	Collaboration/ similar work	Programmes
Marine biology, oceanography, chemistry, ecology, microbiology, mathematics, physics, engineering, computing, modelling.	Laboratories, analytical facilities, workshops, aquaria, outstations, research vessels, IT, libraries.	Intragroup, DRA, SIA, IOSDL, universities.	Fish studies (marine and freshwater, stocks, disease, gear). Estuary, coastal, shelf, deep sea, studies. WOCE, LOIS. Pollution, waste disposal. Environmental impact. Modelling. Special instruments.

ENVIRONMENT (non-marine)

ITE, IFE, IH, MLURI, FCFRS, IVEM, BGS

Skill base	Facilities	Collaboration/ similar work	Programmes
Botany, zoology, chemistry, geology, microbiology, engineering, physics, computing, modelling, mathematics, ecology, hydrology, forestry.	Laboratories, analytical facilities, workshops, animal houses, aquaria, outstations, field centres, IT, libraries.	Intragroup, PML, DML, HARI, POL, IGER, ADAS, National Rivers Authority, Soil Survey, universities.	Global environmental change. Atmospheric and land pollution. Land use and reclamation. Ecotoxicology. Molecular ecology. Biodiversity. Fish studies. Forestry. LOIS. Geological surveys. River ecosystems. Water movement and quality. Conservation/ environmental impact. Special instruments.

BIOTECHNOLOGY AND BIOLOGICAL SCIENCES

IACR, IGER, SCRI, HORI, IAH, IFR, JIC, SRI, BI, RI, MORI, HARI, RRI, NRI

Skill base	Facilities	Collaboration/ similar work	Programmes
Biochemistry, biology, chemistry, molecular and cellular biology, genetics, pathology, physiology, nutrition, ecology, engineering, microbiology, agronomy, immunology, veterinary science, mathematics, modelling, physics.	Laboratories, analytical facilities, field centres, farms, workshops, glasshouses, computing, IT, libraries.	Intragroup, MRC units, MLURI, SAC, ADAS, CVL, NIAB, FCFRS, CSL.	Animal, plant and microbiological studies. Molecular and cellular studies. Reproduction, growth, nutrition, molecular genetics. Disease, diagnosis. Agronomy, agricultural engineering, robotics. Crop protection, pest and pathogens. Nutrient leaching. Modelling. Biotechnology, food production. Technology transfer overseas.

FOOD AND AGRICULTURE

CVL, CSL (including TRS, FSL), SASA, NIAB, ADAS

Skill base	Facilities	Collaboration /similar work	Programmes
Chemistry, physics, biochemistry, microbiology, biology, agronomy, veterinary, food science, engineering.	Laboratories, analytical facilities, field stations, animal houses, farms, glasshouses, workshops, libraries	Intragroup, IAH, CAMR, MORI, HORI, IACR, ADAS, SCRI, SAC, IFR, FRS, RRI, DFR, LGC, universities, Food Research Associations.	Pesticide safety, residues. Plant, animal health. Disease, diagnosis. Horticulture, seed testing, certification. Conservation, wildlife. Food contamination, additives. Microbiology.

ANNEX N PERSPECTIVES ON ORGANISATIONAL STRUCTURES

PERSPECTIVE	EMPHASIS	FACILITATED BY	COMMENTS
A: PSREs should be treated as a "common pool" serving a wide range of customers/user communities.	—PSRE activities co-ordinated with those of other PSREs. —Minimisation of resources in PSREs through savings, flexible use of manpower etc.	—customer willingness to use 'non traditional' sources [Mechanisms: competition sub-contracting collaboration] —Maximum consolidation of present PSREs into largest possible structures, tautly controlled to ensure they do not "grow". —Central/joint/'lead' ownership of PSREs	—caters well for fact that departmental missions overlap, less well for fact that there may be conflicts between departmental interests —may result in 'shift-back' of activities into Departments, especially front line/immediate support activities. Best vertical use of resources? —maximum consolidation means minimal potential for use of the competition mechanism —the larger the structure, the greater the potential for savings and/or more flexible use of resources; but the more difficult the management charge —multiple customers increase the potential for conflicting calls on resources —the higher the number of departmental customers, the greater the difficulty in obtaining the necessary strategic direction.
B: The customer-contractor relationship should be commercialised	—potential savings to the customer, through —tautened customer disciplines —tautened supplier disciplines —potentially useful step on the way to privatisation	—delegation of budgets to customers with freedom to choose (a) whether (b) where to place contracts —increased freedom for suppliers to —diversify/move into other markets —adopt commercial practices (ability to make profits, removal of annuality) —ultimately, freedom for suppliers to say 'no' to Government work. —incentives to both customers and suppliers to use the above freedoms —removal of customer/owner tension through non-customer ownership of PSREs	—implies a single customer/contractor model. But: —different mechanisms appropriate for basic research and other S&T/R&D activity —customer/contractor arrangements are hierarchical; PSREs can help in providing customer intelligence —range of departmental need for S&T varies: some Departments more 'operational,' some more 'enabling' —split between PSREs and parent Departments varies: some PSREs undertake work which is 'delegate' rather than 'contractor' in nature —implies acceptance of costs of participating in competitions —freedom of suppliers to seek new customers/diversify implies no restrictions on growth —need to reconcile freedom for customers with importance of strategic direction: in the private sector supplied by parent company/board

PERSPECTIVE	EMPHASIS	FACILITATED BY	COMMENTS
C: PSREs should be tightly focused on needs of their customer/ user communities	—'effective provision' of scientific expertise and advice (para 5.14 of the White Paper "Realising our potential") —vertical integration: PSRE activities co-ordinated with S&T activities in HQs and other elements of Departments/Research Councils —minimisation of departmental S&T resources through savings, flexible use of manpower etc	—acceptance of use of PSRE resources in operational/ policy roles —smaller-scale consolidation of PSREs into 'market-oriented' structures serving particular customers/user communities tautly controlled to ensure they do not grow —ownership by lead/joint customer Departments	—recognises that "S&T integral to the missions of many Departments" (para 5.14 of the White Paper "Realising our potential") —allows less scope for "smoothing out" peaks and troughs in supplier workload: best horizontal use of resources? —any consolidation reduces the potential for the use of the competition mechanism —smaller structures with fewer customers simplify the provision of strategic direction —mission/focus an important element in privatisation
D: PSRE structure should recognise/reflect territorial responsibilities	geographical integration: PSRE activities co-ordinated with those of other PSREs in same region.	—smaller scale consolidation of PSREs into regional structures, tautly controlled to ensure they do not grow —ownership by lead Department or joint ownership	—geographically-based consolidation neither maximises the 'pool' of PSREs nor focuses on customers/user communities, except to the extent that the latter are definable geographically. —facilitates sharing of resources on a local basis —mechanisms to ensure strategic direction became more complex, the wider the customer/user community.
E: PSRE structures should reflect the difference between basic research and other types of R&D/S&T activity	Haldane principle of separation of basic research from Government Departments.	—separate structures consolidating: (a) Research institutes (b) Others	—Maximises neither 'the pool' nor focus on user communities/customers —Scottish Office see value in their parenting of the whole gamut —Research institutes and other PSREs in practice overlap in the type of work they do

Note All perspectives imply maximum use of private sector.

ANNEX O RATIONALISATION/OWNERSHIP MODELS

Background

We have, as required by our Terms of Reference, considered a number of specific ownership/rationalisation models. The pros and cons of each model, together with our conclusions and recommendations, are given below. In what follows, we have used the term "agency" not in its technical sense of Next Steps Agency but with the more general meaning of a single organisational unit delivering a service to Government.

OPTION 1: A SINGLE CIVIL RESEARCH AGENCY

Total annual cost	£820,556K
Total staff numbers	21318.5

This would bring together under a single owner all the establishments under scrutiny, excluding those scheduled for privatisation or GOCO operation.

Given the breadth of the customer base for such an agency the only credible ownership candidate would be OPSS. The agency would thus stand in a similar relationship to its customers as other OPSS-sponsored agencies such as HMSO.

Pros

— would facilitate an 'arms-length' relationship between customer and owner;

— would provide maximum freedom for customers to source work wherever they wish;

— would maximise the scope for supply-side rationalisation in response to changing customer demands;

— would assist management of technology transfer in the public sector, since the full range of R&D/S&T activities would be undertaken in one organisation.

Cons

— would result in the greatest 'spread' of roles and customers, with consequent difficulty in maintaining a sense of mission and providing strategic direction;

— removing ownership from customer Departments, while clarifying customer/supplier interests, would not remove all the owner constraints;

— would distance Departments from S&T suppliers and reduce the degree of control exercisable by Research Councils;

— there would be an awkward and uneven boundary demarcation between PSREs outside the agency and those within it, unless *all* public sector research establishments were brought in (which would compound the difficulties above).

OPTION 2: A CIVIL RESEARCH AGENCY OR AGENCIES COMPRISING GREs ONLY

Option 2(a): A single agency

Total annual cost	£466,398K
Total staff numbers	12,477.5

This—the main model recommended in the Levene/Stewart report—would encompass all the GREs under scrutiny other than those now en route to privatisation or GOCO.

Option 2(b): Two agencies

This would divide the GREs above into two separate agencies covering physical sciences and life sciences, listed below.

	Physical sciences	*Life sciences*
Total annual costs	£96,641K	£369,757K
Total staff numbers	1912.5	10565

physical sciences establishments

— DOE's Building Research Establishment (until/unless privatised)

— the Home Office's Forensic Science Service and Police Scientific Development Branch

— DTI's National Weights and Measures Laboratory

— HSE's Health and Safety Laboratory

life sciences establishments

— the MAFF-sponsored PSREs (ADAS until/unless privatised; the Central Veterinary Laboratory; the Central Science Laboratory; the Directorate of Fisheries Research; the National Institute of Agricultural Botany; Horticulture Research International)

— ODA's Natural Resources Institute (until/unless merged with a university)

— SOAFD's Fisheries Research Services and the Scottish Agricultural Science Agency

— the Department of Health NDPBs (Public Health Laboratory Services, National Radiological Protection Board, National Institute for Biological Standards and Control)

— the Forestry Commission's Forest Research Stations

Again, given the breadth of the customer base of such an agency or agencies, the only real candidate as owner would be OPSS.

Pros

— in respect of departmental customers, would facilitate an arms-length customer/supplier relationship, thereby empowering customers;

— would provide a tool for realising the cross-departmental potential for savings/flexibility identified in Annex K;

Cons

— would not take account of the potential for rationalisation across GRE/ Research Institute boundaries, and between RIs in different ownership. This would have to be addressed by other means;

— would distance Departments from S&T suppliers, while removing some, but not all, ownership constraints;

— the spread of customers and missions would result in difficulties of strategic direction: the physical sciences element of Option 2(a) (and therefore the physical sciences agency at 2(b)) would represent a particularly disparate grouping.

OPTION 3: MARKET SECTOR-ORIENTED CIVIL RESEARCH AGENCIES

This option would bring establishments with common or related missions and or user communities into separate agencies.

Option 3(a): two agencies

The agencies to be formed under this option would cover:

Environment (overlap areas 1 and 2 of Annex K)

Total annual cost (PSREs under scrutiny) :	£146,642K
Total staff numbers	3075.5

composition:

— all current NERC institutes, plus NERC's marine vessels service[1]

— MAFF and Scottish Office laboratories dealing with fisheries and marine environment

[1] This grouping would also include NERC RIs outside the ambit of the scrutiny

— the Macaulay Land Use Research Institute, a Scottish Agricultural Research Institute

— the Forestry Commission Forest Research Stations

Biotechnology/biological science and Food/agriculture
(overlap areas 3 and 4 of Annex K)

Total annual cost	: £334,897K
Total staff numbers	: 9888.5

composition:

— all current BBSRC institutes

— the Scottish Agricultural Research Institutes other than MLURI

— ODA's Natural Resources Institute, if not merged with a university

— all MAFF-parented PSREs (including ADAS until/unless privatised)

— SOAFD's Scottish Agricultural Science Agency

On the basis of primary interest, the most appropriate ownership options for the above would be NERC (Environment); and BBSRC (biotechnology/ biological sciences and food/agriculture).

Pros

— would improve strategic direction, with relatively homogeneous customer communities;

— would address all of the main concentrations of overlap identified by the scrutiny;

— would provide groupings of sufficient size to ensure critical mass and scope for flexible management.

Cons

— operational Departments would lose linkage with suppliers of S&T services; Scottish Office would also lose traditional responsibility for agricultural research establishments dealing with basic research;

— Research Councils' culture not attuned to providing S&T to Departments;

— would address only in part the issue of separation between customer and owner.

Option 3(b): four agencies

A second market-sector oriented option would be to form agencies closely aligned with the areas of concentrated overlap identified in Annex K, covering:

Marine resources and environment

total annual cost	£56,952K
total staff numbers	1019.5

composition:

— NERC's Dunstaffnage and Plymouth Marine Laboratories and Proudman Oceanographic Laboratory[2], plus NERC's marine vessels service

— MAFF and Scottish Office laboratories dealing with fisheries and marine environment

Environment (non-marine)

total annual cost	£89,690K
total staff numbers	2056

composition:

— NERC's Institute of Terrestrial Ecology, Institute of Freshwater Ecology, Institute of Hydrology, British Geological Survey and Institute of Virology and Environmental Microbiology[3]

— the Macaulay Land Use Research Institute

— the Forestry Commission Forest Research Stations

Biotechnology and Biological Sciences

total annual cost	£184,031K
total staff numbers	5627

composition:

— all current BBSRC institutes

— the Scottish Agricultural Research Institutes other than MLURI

— ODA's Natural Resources Institute, if not merged with a university

— MAFF's Horticulture Research International

Food and Agriculture

total annual cost	£150,866K
total staff numbers	4261.5

composition:

— all MAFF-parented PSREs except Horticulture Research International

— SOAFD's Scottish Agricultural Science Agency

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[2] NERC has recently announced plans to group these into a Centre for Coastal and Marine Sciences
[3] plus other existing NERC establishments. NERC's recent announcement groups all the NERC PSREs listed, with the exception of BGS, into a new Centre for Ecology and Hydrology.

The ownership for these agencies could be

Marine resources and environment : Scottish Office (on the grounds that 70% of the UK fish catch is in Scotland)

Environment (non-marine) : NERC (the current owner of most PSREs within the grouping)

Biotechnology and Biological Sciences : BBSRC (main current owner)

Food and Agriculture : MAFF (main current owner)

Pros

— as for Option 3(a) but also:—

— would remove the awkwardness of Research Councils providing significant amounts of S&T to Government Departments.

Cons

— specific cases of overlap between the groups would need to be addressed by separate mechanisms;

— potential for conflict of priorities between customer and owner Departments;

— would divide NERC's current environmental responsibilities (although NERC would retain a customer role for marine environment).

Option 3(c)/3(d): three agencies

Hybrid options between 3(a) and 3(b) would also be possible involving the creation of three agencies: *either*

(i) Environment [costs £146,642K; staff 3075.5]

Biotechnology/Biological Sciences [costs £184,031K; staff 5627]

Food and Agriculture [costs £150,866K, staff 4261.5]

or

(ii) Marine resources and environment [costs £56,952K, staff 1019.5]

Non-marine environment [costs £89,690K, staff 2056]

Biotechnology/Biological Sciences & Food and Agriculture [costs £334,897K, staff 9888.5]

Ownership options and pros and cons would be a combination of those for Options 3(a) and 3(b).

OPTION 4: GEOGRAPHICALLY-BASED CIVIL RESEARCH AGENCIES

The first element of this option would bring together establishments located in Scotland under Scottish Office ownership:

total annual cost (PSREs in scrutiny)	£56,026K approx
total staff numbers	1690 approx

composition:

- all PSREs in scrutiny currently parented by SOAFD (plus other SOAFD establishments)
- the Scottish sites of NERC's Institute of Terrestrial Ecology
- BBSRC's Roslin Research Institute
- the Forestry Commission's northern Forest Research Stations
- NERC's Dunstaffnage Marine Laboratory
- the former Torry Research Station (now part of MAFF's Central Science Laboratory) and the Lasswade laboratory of MAFF's Central Veterinary Laboratory

BBSRC and NERC would remain responsible for their institutes in England and Wales; MAFF's Horticulture Research International, ODA's Natural Resources Institute (unless merged with a university) and the Forestry Commission's southern research stations would transfer to BBSRC and NERC as in Option 3.

MAFF's other English and Welsh PSREs would be brought together in a single agency:

total annual cost	£163,798
total staff numbers	4420.5

composition:

- the Central Veterinary Laboratory
- the Central Science Laboratory
- the Directorate of Fisheries Research
- the National Institute of Agricultural Botany
- ADAS (until/unless privatised)

Pros

- would accord with the thrust of the Government's White Paper "Scotland in the Union";
- would encourage local sharing of facilities;
- would provide a tool for addressing a proportion of the overlap identified in Annex K;
- would cater for some geographical considerations.

Cons

— geographical considerations do not necessarily coincide with national boundaries: structures based on the latter may result in awkwardly divided activities (eg forestry research);

— many of the overlaps identified in Annex K are cross-border, as well as trans-departmental, in nature: these would have to be addressed by other mechanisms;

— marginal separation of customer/owner responsibilities. Separation could be increased in the Scottish case if the owner function were located centrally within the Scottish Office.

ANNEX P HSE CRITERIA FOR INTRAMURAL RESEARCH PROGRAMME

The overriding considerations are that the resources should be used to undertake work to meet HSE's needs as an enforcement authority, focused on areas identified as high priority to meet HSE's policy and operational objectives and for work that is not, or cannot be, undertaken by industry itself.

SPECIFIC CRITERIA

The criteria that influence whether a particular research activity has to be pursued by Research and Laboratory Services Division include:

— where independent advice is required by HSE on the extent and nature of the risks involved;

— where the risk of relying on third parties for continuity and/or timeliness is unacceptable;

— where information is needed in the light of incident experience or to support specific enforcement activities or policy initiatives;

— where key teams and capabilities need to be maintained to secure continued independent forensic capacity;

— where there is a need for informed participation in national and international standards making;

— where projects, though with clear health and safety benefits, are too risky for firms to go ahead themselves; for example, when timescales are long and/or the technical risks are high;

— when the particular part of industry lacks the relevant scientific and technological expertise;

— when entry costs are high for manufacturers of safety-related equipment and the industry is small and fragmented;

— where industry is complacent or uninnovative and requires the stimulus and competition of new ideas to encourage improvement;

— where specialised equipment is required for which only one national facility can be justified;

— when the potential beneficiaries are too diffuse for any one company to undertake the research on its own or the availability of results will be restricted;

— where only HSE can assemble mixed combinations of relevant specialisms;

— where added value in terms of in-depth understanding on a topic is gained through actually doing the research and enhances HSE standing and credibility as a regulatory and standards body.

ANNEX Q LIST OF MAIN ACRONYMS USED IN THE REPORT

Acronym	Full name
AEA	AEA Technology
AFRC	Agricultural and Food Research Council (incorporated into BBSRC as of 1 April 1994)
ARC	Agricultural Research Council (forerunner of AFRC)
BBSRC	Biotechnology and Biological Sciences Research Council
BGS	British Geological Survey
BI	Babraham Institute
BRE	Building Research Establishment
CAMR	Centre for Applied Microbiological Research
CAROS	Consortium of Agricultural Research Organisations in Scotland
CCSU	Council of Civil Service Unions
CRA	Civil Research Agency
CSL	Central Science Laboratory
CVL	Central Veterinary Laboratory
DFR	Directorate of Fisheries Research
DGRC	Director General of Research Councils
DH	Department of Health
DML	Dunstaffnage Marine Laboratory
DOE	Department of the Environment
DOT	Department of Transport
DRA	Defence Research Agency
DSIR	(former) Department of Scientific and Industrial Research
Dunn	Dunn Nutrition Unit
DTI	Department of Trade and Industry
EPSRC	Engineering and Physical Sciences Research Council
EU	European Union
FC	Forestry Commission
FCFRS	Forestry Commission Forest Research Stations
FEC	Full Economic Cost

Acronym	Full name
FRS	Fisheries Research Services (Marine Laboratory Aberdeen and Pitlochry Laboratory)
FSL	Food Science Laboratory (now part of CSL)
FSS	Forensic Science Service
GOCO	Government-owned-contractor-operated
GRE	Government Research Establishment
HRI	Hannah Research Institute
HEFC	Higher Education Funding Council
HEI	Higher Education Institution
HO	Home Office
HORI	Horticulture Research International
HSE	Health and Safety Executive
HSL	Health and Safety Laboratory (formerly RLSD)
IACR	Institute of Arable Crops Research
IAH	Institute for Animal Health
IFE	Institute of Freshwater Ecology
IFR	Institute of Food Research
IGER	Institute of Grassland and Environmental Research
IH	Institute of Hydrology
IPSR	Institute of Plant Science Research (now the John Innes Centre)
IOSDL	Institute of Oceanographic Sciences Deacon Laboratory
ITE	Institute of Terrestrial Ecology
IV	Institute of Virology
IVEM	Institute of Virology and Environmental Microbiology
JIC	John Innes Centre (formerly IPSR)
LGC	Laboratory of the Government Chemist
LOIS	Land-Ocean Interaction Study
MAFF	Ministry of Agriculture, Fisheries and Food
MLURI	Macaulay Land Use Research Institute
MPFSL	Metropolitan Police Forensic Science Laboratory
MOD	Ministry of Defence
MORI	Moredun Research Institute
MOU	Memorandum of Understanding
MRC	Medical Research Council
NDPB	Non-Departmental Public Body
NERC	Natural Environment Research Council

Acronym	Full name
NIAB	National Institute of Agricultural Botany
NIBSC	National Institute of Biological Standards and Control
NEL	National Engineering Laboratory
NPL	National Physical Laboratory
NRA	National Rivers Authority
NRI	Natural Resources Institute
NRPB	National Radiological Protection Board
NWML	National Weights and Measures Laboratory
ODA	Overseas Development Agency
OPSS	Office of Public Service and Science (Cabinet Office)
OST	Office of Science and Technology (Cabinet Office)
PAC	Public Accounts Committee
PES	Public Expenditure Survey
PHLS	Public Health Laboratory Service
PML	Plymouth Marine Laboratory
POL	Proudman Oceanographic Laboratory
PSDB	Police Scientific Development Branch
PSRE	Public Sector Research Establishment
R&D	Research and Development (see Annex D for full definition)
RBU	Reproductive Biology Unit
RC	Research Council
RCI	Research Council Institute
RI	Roslin Institute
RIs	Research Institutes (a collective description for RCIs and SARIs)
RLSD	Research Laboratory Services Division (now the Health and Safety Laboratory)
ROAME	A system of contract management based on Rationale, Objectives, Assessment, Monitoring and Evaluation
RRI	Rowett Research Institute
RU	Radiobiology Unit
S&T	Scientific and Technological Services (see Annex D for full definition)
SAC	Scottish Agricultural College
SARI	Scottish Agricultural Research Institute
SASA	Scottish Agricultural Science Agency
SCRI	Scottish Crop Research Institute

Acronym	Full name
SERC	Science and Engineering Research Council (responsibilities now redistributed)
SHHD	Scottish Home and Health Department
SIA	Seafood Industry Authority
SO	Scottish Office
SOAFD	Scottish Office Agriculture and Fisheries Department
SRI	Silsoe Research Institute
TRL	Transport Research Laboratory
TRS	Torry Research Station (now part of CSL)
TU	Toxicology Unit
VU	Virology Unit
WHO	World Health Organisation
WOCE	World Oceanographic Circulation Experiment
WSL	Warren Spring Laboratory

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